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GENESIS OF SCHIZOPHRENIA

OLUF BRÜEL
Copenhagen

I

The thesis advocated in the present article is illustrated by the following case history.

A young man of nineteen, student of law, schizoid (beginning schizophrenia?).

At the request of his parents and the family physician the patient has been admitted to the clinic on the strength of the diagnosis: *Morbus mentalis, Tentamen suicidii.*

He is a young man of medium height and build; his muscles are fairly well developed, though he does not play games. His hair is coarse and abundant; his face, pale, narrow, with a rather high-bridged nose; the expression in his dark eyes is a mixture of fear and defiance. Although sullen and uncommunicative, his generally augmented reflexes and pronounced defensive attitude suggest that inwardly he is very much on the alert. He wants to be left alone, only to be left alone. . . .

Typologically he is an athleto-schizoid, the only child of rather queer, though socially successful, schizoid parents (father a leading teetotaler, mother one of the pillars of the movement for women's rights). In his education, as one-sided as possible, the spiritual and intellectual side has always been stressed one-sidedly, and he grew up in the unhealthy, intellectualized, and "sublimated" atmosphere of his home almost till his present age of nineteen, without having acquired an adequate knowledge of the facts of sexual life in man.

Then, on a students' excursion, he met a girl student, and soon a close friendship sprang up between them. She was naturally the more advanced of the two, and during the following weeks he was swept from his state of naïve innocence into the very preliminaries to companionate marriage. This, however, was not brought to what

might be termed "the bitter end," because our naïve young man introduced, quite unsuccessfully, the lady of his choice into his "desexualized" home; and she—soon tiring of so much pure intellect —abruptly took leave and returned to her native, provincial town with its more human atmosphere. On the face of it, this experience made very little impression on our patient, but soon his life took a curious turn: all of a sudden, he plunged headlong, not into debauchery, but into his studies, into the strife of academic associations and politics. He, the son of a distinguished liberal, became, overnight, a supporter of, and ardent believer in, the sacred cause of bolshevism. From this moment he spent most of his time in the dingy, crowded rooms of his chosen group, making burning speeches, participating in interminable discussions—whole nights were spent in the small rooms, stuffy with the stale odor of cheap tobacco. (Bolshevism—symbol of sexual freedom.)

After a month and a half of this, he at last reached the end of his tether. Early one morning he appeared with his left wrist bleeding from a rather ugly looking transverse cut, made by an old razor blade. A few hours later he was brought to the clinic.

At first he was very difficult to manage, touchy and reserved. Whenever he ventured to utter a few words he was afterwards completely exhausted, and sunk, sullen and weak, back onto the pillows. For six weeks it was necessary to have a trained nurse near him night and day.

Only little by little was it possible to learn the sparse facts stated above, some of which were first actually furnished by his parents. His attitude was very strongly defensive (negativistic); he wanted to be alone, not to be disturbed, and would not leave his room (autism). He slept only when given strong drugs. During the day a certain uneasiness alternated with long periods of the stony indifference and queer attitudes so characteristic of the catatonic type.

What little talk he could be induced to venture was marked by a stereotyped uniformity typical of this ailment. He was very suspicious. When one of the nurses was leaning over him in the endeavor to straighten the bed-cover, he cried out angrily: "What are you doing, why do you want to beat me?" (Paranoid element.)

By applying the method which I have characterized as the "psychotherapy of the gentle touch," we gained, at the close of the second

month in the clinic, so much headway, that he would talk, read, go into the garden for a walk, and so on.

By this time he also disclosed to me that his attempt at suicide had not really been serious, but merely "symbolic," in fact, a means of giving those around him to understand, without painful words and explanations, that there was something alarmingly wrong with his emotional life. At first he tried to bar the emotional tension from his consciousness, and when he felt that he was bound to fail, he almost instinctively chose this dramatic means to run away from himself and to find a place of refuge from his conflicting emotions, more suitable than the club rooms of the bolshevistic association. . . . He found this haven in the clinic for mental diseases. After three months he was able to go about, take long walks in the country, by himself or in company of other patients or nurses off duty, and two weeks later he was remitted from the clinic as restored to health.

He wrote me a gay post-card when on his holiday in Sweden—a country whose population belongs largely to the schizo-group. It may be added that the private nurse of the patient and also two of the doctors belong to the schizoid type. An assistant doctor whom the patient always regarded with dislike is, however, rather of the opposite, cyclothymic, type.

In the three years which have now gone by no relapse has occurred. The patient took up again his law studies, did very well, and passed two of his examinations not only without difficulty, but even with distinction.

II

In bygone times people were inclined to regard mental and nervous diseases as states differing in quality from those of the normal mind, and imagined that the patients were "possessed by the devil," "by evil spirits," and the like.

Even long after such views have been completely abandoned, the tendency has remained to look upon the mental sufferer as essentially different from the sane man.

Although the medical profession has persistently been opposed to such a primitive conception of mental aberrations, it is only in the most recent times that the new point of view promises to be more generally accepted. The findings of Freud and Kretschmer especially have contributed to spreading this conception beyond the narrow circle of professional men.

Freud repeatedly maintains that the mental patient is to be regarded merely as quantitatively different from the sane person—the patient is, as he puts it, contending with the same problems and difficulties with which we normal people also have to cope.

True, in the passage mentioned Freud refers to the neuroses, but later investigations show a similar, principally quantitative conception of the psychogenetic psychoses—especially since the Freudian conception of regression has been developed.

According to Freud everybody is afflicted with inhibitions, complexes, and regressions, but in the sane or normal person the emotional energies bound in these phenomena and those disposed of in other ways are so well balanced that the daily life of the individual is not markedly impaired. Consequently, no symptom in the strict sense of the word is formed in the normal person, although certain character traits, idiosyncrasies, sympathies, antipathies, and the like, develop and have to be regarded as diluted forms corresponding to the neurotic or psychotic manifestations proper.

According to Kretschmer an uninterrupted line leads from the normal schizothymic person through the intermediate schizoid forms to the culminating point, the schizophrenic psychosis; for even in the most normal schizothymic there are, even though in rudimentary shape, unmistakable analogies with the mental mechanisms which give the schizophrenic psychosis its specific character.

Thus the research work of Freud and Kretschmer has made it possible to gain a deeper insight into what is actually going on in the mind of the insane. By studying those cases where one of the corresponding normal character-traits develops—suddenly or by degrees—into a schizoid or a schizophrenic symptom, by following up the various stages of this transformation, we may learn something about the genesis of schizophrenia.

Following Bagotsky's distinction between objective (*gegenständliche*) and subjective (*zuständliche*) consciousness, Birnbaum[1] maintains that one of the most essential characteristics of the schizophrenic patient is that he has lost the ability to feel, to take emotional interest in things around him.

This may be true, at least partly so, in the most severe or advanced cases which have persisted throughout decades, and possibly also in somewhat less pronounced cases. But, in our view, this explanation is hardly more than an illustration or description of

[1] *Münchener Medizinische Wochenschrift*, Jan. 2, 1931.

what *apparently*—on the surface, as it were—takes place, but in point of fact does not express the real psychopathic processes going on within the patient.

Experienced students of psychoanalysis, or medical men who have for years practiced psychotherapy, feel less and less inclined to take manifestations of psychological processes at their face value. For only too often have they learned in the course of their endeavors that a manifestation is not merely different from the underlying inner process, but that, more often than not, it is an expression of an entirely opposite process. Thus a manifest positive quality frequently goes with a latent deficiency, because the patient instinctively tries to shroud the weak points in his mental or emotional make-up. In everyday life we frequently come across this disparity between *esse* and *videri*: a man who brags and boasts of his courage often tries to conceal his fear and cowardice.

Contrary to the assumption that the schizophrenics are devoid of subjective ("situative") feeling, it seems more in accordance with a general psychodiagnostic and psychotherapeutical experience that schizoids and schizophrenics do possess the ability of intensive inner life and feeling in a truly excessive degree; in fact, in such a degree that almost every event, often one which to others may appear trivial might give rise to a storm of pent-up emotion, culminating in a complete disruption of personality from within.

A very natural reaction to such a great emotional stir is that the patient falls back upon the defensive psychological weapon of blocking unpleasant emotions from his consciousness and thus, gradually, establishing an invisible wall, or a psychological "gas-zone," as it were, between the innermost, intimate self and his environment—a condition which Bleuler calls schizophrenic autism.

This process can, naturally, be seen most clearly when schizophrenia, released by a very effective psycho-traumatic experience, is developing acutely. One is in these cases an eye-witness to that "drawing-in" of the delicate and sensitive core of the individual, of that fateful "glazing-over of the personality by a layer of ice," so impressively described by Kretschmer. But even in less pronounced cases where this insulating process takes place only little by little, as for instance in the prepsychotic schizoid who by successive emotional shocks gradually becomes psychotic, it is reasonable to assume that these must be hypersenstive, highly-strung individuals. Although, this standpoint is far from being in accordance with the general

view, it tallies well with the true character of a gradually developing state of *apparent* insensitiveness.

Birnbaum points out that, if one tells a schizophrenic mother that her child is dead, she will understand the fact, but will remain emotionally indifferent towards it. This may be correct, but when the author continues: "she is devoid of that situative sentiment which would enable her to feel what she hears," and adds: "this also explains her lack of emotional expression," he has obviously stopped his investigation at an early stage and should have proceeded one step further.

We maintain that, far from being deficient in emotional sensitiveness, these patients possess a hypersensitive and over delicate inner life. What has led previous investigation astray in this respect is the fact that in schizophrenic patients these traits do not find expression in the normal way.

An opponent to our view will probably raise the following objection. If the ability for feeling, if hypersensitiveness be present, why then is it not being actualized, what is the reason that it does not manifest itself on suitable occasions?

The explanation is this: Instead of a defect in the emotional make-up of the patient, presumed by the older view, an effect, in the form of an inhibition, is brought forth. In the afferent nerves, somewhere between environmental reality and its emotional perception by the patient, a protective resistance (*Sperrung*) is materializing. In other words, an inhibitory barrier has been formed which is blocking—more or less completely—the "situative," the emotional perception of an inadmissible aspect of the objective world. According to this view, the process of blocking is not to be regarded as a completely useless act, but rather as a purposeful, expedient reaction of the instinct of self-preservation, which in the particular circumstances appears adequate. Just as in the case of a man who, being no longer able to endure his sufferings, falls into a faint, and one who, having exhausted his strength, is overcome by sleep. Nature here generously attempts to provide a protection for the hypersensitive.

In normal individuals this defensive mechanism is not uncommon. Take, for instance, the situation of a person who has the foreboding that an oncoming event will have an emotionally shattering effect on him and who tries to "keep it at arm's length," because he does not want to be overwhelmed emotionally. Also the common expression "to harden oneself" depicts, in an expressive way,

the need for emotional "insulation"—a process which is to be found at the bottom of every deeper estrangement between objective and subjective consciousness.

While in the normal personality, including the schizothymic, this defensive mechanism appears mainly as the result of an act of volition, we find already in the reactions of the schizoid personality a certain degree of automatism. This makes the idea of the automatic reaction of the manifestly schizophrenic patient less difficult to grasp. If the explanation offered in the present paper is accurate, it would appear that the defensive mechanism comes into action most easily in those hypersensitive individuals who are most in need of its protective function.

The intensity which an unsettling psycho-traumatic event has to reach before the defense-mechanism sets in is different for the three types of persons considered; also, as regards the time which elapses before the blocking process is toned down or else disappears completely, there is a difference between the normal individual, the intermediate schizoid psychopath and the completely schizophrenic patient.

For the normal individual "time heals all wounds," but for the schizoid the validity of this old saying is very problematic, while for the schizophrenic it hardly holds at all.

That some such process as that described above actually takes place can be inferred from cases where an impression, an experience reaches the schizophrenic's innermost core, involving, eventually, his situative feeling. Then his reaction is no longer one of the smooth scale from joy to sorrow as in the extroverted person, but is of an explosive nature, showing not only that a considerable amount of feeling is present, but also that it has been subjected to some inhibitory process.

What actually happens may, to some extent, be explained metaphorically: the emotional reaction of the extroverted person runs—to use a simile from the chemistry of explosives—much on the same line as the combustive process when gunpowder, lying freely exposed, is ignited: it burns down with a harmless crackle. In the schizoid, introverted individual, however, we are reminded of the process that occurs when the explosive is shut up in a shell: the ignition takes place only after a blow; and, since the tightness of the shell blocks natural expansion, the result is a violent explosion. Thus a patient, for years considered as harmless and quiet, may suddenly

come out of his "complete insensitiveness" and throw a chair at the doctor if his inmost feelings have in some way been hurt.

Although it cannot be denied that the extremely defensive attitude of the schizophrenic patient fully satisfies the need to protect the hyper-sensitive core at any price (a need which is so urgent at the moment of the shattering psycho-traumatic experience), the definite cutting off of all relations to an unkind outer world is, from a more practical point of view, no doubt, a high price to pay for the so ardently desired emotional immunity.[2]

Even if he has reached that tragic emotional stage which the schizophrenic Danish king, Christian VII, with so deep an insight into his own condition, called "completely fretted out" (*ausgeärgert*),[3] he has attained this freedom from suffering at no less a cost than his mental sanity.

By such automatization of a self-defensive mechanism—greatly exceeding all reasonable, not to speak of optimal, claims—the patients do not really gain any advantage, but merely an overcompensation which becomes fateful to them in accordance with the old maxim: "The remedy is worse than the ailment."

However, there is nothing unique about this, an apparently so unpractical, process, for it has numerous parallels not only in the psychotherapeutic but also in the medical clinic. Compare, for instance, the way in which a failing heart tries to compensate for its defect by an all too hurried and violent hypertrophy, followed by a degeneration of the myocardium; or the biological "habit" by which the body, after a long spell of fever, tries to retain the abnormally raised temperature to which it has now become accustomed, at a time when the illness proper might be over. Many other examples could be quoted.

In all such cases it seems as if Nature did not know the middle course, did not learn to apply the finer therapeutic measures. She seems to act almost like the proverbial woman who throws away the child with the bath-water.

It will be a great, though exacting, task for future psychiatry to find prophylactic measures by adopting more cautious and understanding methods in the treatment and education of children and

[2] O. Brüel, "Zum Schizophrenieproblem," *Monatsschrift für Psychiatrie und Neurologie*, 1931; and "Omkring Schizophrenieproblemet," *Bibliotek for Laeger* (Copenhagen, 1931).

[3] Viggo Christiansen, *Christian VII's Sindssygdom* [*The Mental Disease of Christian the VII*] (Copenhagen, 1906).

youths belonging to the schizoid type. By the application of a delicately balanced mixture of leniency and training, therapeutic measures will be developed through which a gradual wearing down of the hypertrophied emotional inhibition due to a too powerful defensive mechanism, may be attained.

The direction of the future development in this respect has already been shown by Alexander,[4] Sullivan,[5] Nunberg,[6] and Landauer.[7] Sullivan reports that he has obtained unusually good results in cases of schizophrenia by the apparently simple device of very careful selection of the attendants. He insists that schizophrenic patients should not be kept in a typologically alien, but rather in a homologous environment; i.e., that only attendants of the schizotype should take care of the schizophrenics. His experiments are not yet completed, but his present results may be regarded as very gratifying.

Interesting information, received from a Swedish colleague as to the morbidity among schizophrenics in different parts of Sweden, points in the same direction. It is in the northern and middle parts of the country, where the inhabitants are predominantly schizothymic (homologous environment), that this morbidity is lower; in the South where the population is more mixed it is higher. Contrary to what one would expect at first view, this observation shows an inverse proportion of the number of normal schizothymics in a given area to schizophrenic morbidity. Some influence may also be attributed to the scarcity of the population, a fact which tends to lessen the possibilities of social friction and makes a pathological elaboration of "autism" superfluous.[8]

It can be regarded as a fact that the schizothymic individual is feeling at his best either in his own company, or in a homologous

[4] Alexander, *The Medical Value of Psychoanalysis* (London), especially pp. 147 and 156.

[5] Sullivan, *Proceedings of the Second Colloqium on Personality Investigations* (Baltimore), pp. 46, 47, and 107.

[6] Nunberg, "Der Verlauf des Libidokonfliktes in einem Falle von Schizophrenie," *Int. Zeit. f. PS.*, VII.

[7] Landauer, "Spontanheilung einer Katatonie," *Int. Zeit. f. PS.*, I.

[8] In Iceland which, in typology as well as in elbow-room for the population, may well be compared with North Sweden the morbidity of schizophrenics is also reported to be low, compared, for instance, with Denmark with its heterogeneous population and a large amount of cyclothymics. Compare also the very pronounced leaning towards solitude in the schizo-group.

environment where he is able to discard much of his usual reserve.[9] That an analogous process, wearing down even higher degrees of emotional inhibition and blocking, can take place, appears quite natural from the standpoint of the quantitive view advanced at the beginning of this paper, and has been, as mentioned already, successfully applied in practical therapy by Sullivan.

[9] Similarly, schizothymics who travel for recreation will instinctively choose countries with predominantly schizothymic populations. As a result of the lessened friction, they have here the optimal possibility of expansion and discard, more or less, their usual defensive attitude which among a more heterogeneous population they would consider indispensable. We should not forget that these individuals regard the opposite type, i.e., the cyclothymic individual, their inferior and a rather trying acquaintance, a sort of savage, lacking the social graces of their own type, not to speak of that consideration for personal integrity which, in point of fact, constitutes one of the most marked character traits of the schizotype, if not the very bed-rock of his mind.

ARE ATTITUDES BIOLOGICAL OR CULTURAL IN ORIGIN?

G. W. ALLPORT AND R. L. SCHANCK
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Every reader is familiar with the lively current controversy between "culturalists" and "individualists." The former declare that the roots of social attitudes lie in the folkways and in surrounding social patterns; personality, they say, is merely "the subjective aspect of culture." The individualists, on the other hand, find the root of attitudes in the *native* propensities of men, maintaining that personality develops primarily "from within." The extent of the social influence, they hold, is usually exaggerated. They also insist that the concept of "cultural causation" rests upon a logical fallacy, for causation should be conceived only in terms of the motives of individual men. The alignment in this controversy roughly marks off writers with a sociological bias from those with a psychological bias,[1] providing plenty of zest in the contemporary literature of social psychology, and animating the issue, so popular in the United States, which has come to bear the designation "Culture and Personality." The dispute, of course, is in reality an ancient one; it is none other than the issue of *nurture vs. nature* in modern guise. Although most readers have probably concluded long ago that there is "truth on both sides," a demonstration in any

[1] The sociological bias is exemplified most clearly in the writings of cultural anthropologists, perhaps all of whom would agree with M. Mead that *"the perpetuation of social forms follows different laws than those of individual consciousness."* By and large sociologists are of the same persuasion, although there are numerous exceptions; e.g., F. H. Hankins, a sociologist, warns members of his profession not to overlook the highly selective way in which each organism reacts to its social environment ("Organic Plasticity versus Organic Responsiveness in the Development of the Personality," *Publications of the American Sociological Society,* 1928, XXII, 1-13). In this argument the position of Hankins is typically that of the psychologist. On the other hand, G. and L. B. Murphy, themselves psychologists, attack their professional colleagues for committing the "organism error," viz., overlooking the rôle of the social situation in the functioning of attitudes, ("The Influence of Social Situations upon the Behavior of Children," *Handbook of Social Psychology,* Worcester, Mass., 1935, Ch. xxii).

given instance of *how much truth* falls to each party in the dispute has been seldom achieved.

The simple experiment herein described seems to shed new light upon the issue. It discloses first and foremost the supremacy of the biological factor in shaping social attitudes, but at the same time clearly demonstrates the not inconsiderable rôle played by cultural influence. Only one cluster of attitudes is studied in this experiment, but since the cluster chosen is representative of a large class of similar social attitudes, some generalization of the principles involved seems justified.

The Experiment

The following exercise (originally suggested by Professor F. H. Allport) was assigned to students in social psychology at Harvard College and Radcliffe College annually for five years:

"In greater or less degree the law condones the taking of a human life under the following circumstances. Assuming that the circumstances of the combat always give fair play to both combatants, arrange these situations in the order of greatest justification for the killing at the top of the list to least justification at the bottom, following your own feelings as a guide.

(a) in defending the safety of one's family
(b) in protecting one's property against trespassers
(c) in defending the honorable reputation of a member of one's family
(d) in defending one's property against burglars
(e) in defense of one's own life
(f) in fighting for one's country
(g) in order to protect one's own honor or reputation
(h) in order to save the life of another human being."

Table I gives a summary statement of the results of the five years averaged together. The sex differences are slight though worthy of note.

In respect to all but three of these situations the rank-order of justifiability for homicide remained the same year after year. Only in the group of situations dealing with "honor" was there any shifting, the yearly variations being reported in Table II. In no instance does *honor* rise as high in the scale of justifiability as defense of *persons,* and in no case does it fall as low as the defense of *property.*

But the relative justification for taking human life in the defense of the various *champs d'honneur* seems to vary with the times.

TABLE I

THE RELATIVE STRENGTH OF ATTITUDES JUSTIFYING HOMICIDE

Situation	Number of Cases: Men = 200. Women = 110.					
	Order of Justification		Average Rank		Average Deviation	
	Men	Women	Men	Women	Men	Women
Defense of Self	1	1	1.69	1.83	.88	.96
Defense of Family	2	2	2.16	2.55	.63	.99
Defense of Another	3	3	3.45	2.82	1.19	1.11
Defense of Country	4	4	5.09	4.78	1.84	1.65
Defense of Honor of Family	5	6	5.14	5.25	1.14	.89
Defense of Honor of Self	6	5	5.56	5.14	1.18	1.20
Defense of Property against Burglars	7	7	5.94	6.31	1.13	1.09
Defense of Property against Trespassers	8	8	6.99	7.33	1.13	.91

TABLE II

ANNUAL VARIATIONS IN JUDGMENTS

Situation	Rank in 1931		Rank in 1932		Rank in 1933		Rank in 1934		Rank in 1935		Avg. 1931-35	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Defense of Country	4	4	5	4	6	4	5	4	4	5	4	4
Defense of Honor of Family	5	5	4	6	5	5	4	5	5	6	5	6
Defense of Honor of Self	6	6	6	5	4	6	6	6	7	4	6	5

THE BIOLOGICAL ROOT OF THESE ATTITUDES

The unambiguous decision of our subjects is that an immediate threat to one's *physical* safety is by far the most justifiable cause of homicide. The justification of killing in self-defense is admitted as

readily by the law. Why? No answer seems possible without reference to the *instinctive* nature of the struggle-response. The earliest manifestations of this struggle-response in infancy, psychologists agree, are elicited by actual physical restraint. The young organism "fights" impartially with people and with things that limit its freedom of movement. The first steps in conditioning this primitive response is reached when the infant struggles "in advance" upon perceiving the approach of a threat or menace to his personal safety.

Pursuing this logic further, it appears that the order of justifications (which may be viewed as rationalized and verbalized "efferent modifications" of the struggle-response itself) follows perfectly the principle of the "recession of the stimulus." Owing to the primacy, the frequency, the intensity, and the intimacy of the association between one's own safety and the safety of one's family, this conditioned situation becomes the next in order in provoking combative responses (and justifications thereof). Other human beings, not members of the family, have potent conditioning value, and stand third in the order of justification. Especially for women this form of "sympathetic" struggle follows close on the heels of the defense of family. For both sexes there is agreement that killing for the protection of life (the biological value) is far more justifiable than homicide in the cause of honor or of property (cultural values).[2]

For all its fabled importance, honor is not as provocative of immediate self-defense as is an attack upon one's physical safety. But in placing honor higher than *property,* our judges endorse Iago's opinion,

> Who steals my purse steals trash. . . .
> But he that filches from me my good name. . . .
> . . . makes me poor indeed.

Of the two possessions that we are taught in our culture to prize, *honor* is more precious (more prepotent) to us than *property;* but neither is as basic in the scale of attitudes as physical safety.

Within the group of honor-situations there is considerable variation of opinion. Our results show individual differences, sex differences, and time differences. To a large extent, as will soon be demonstrated, these differences reflect *cultural* influences. First,

[2] Not only is the placement of the physical-situations uniformly higher for both sexes, but the individual variation as measured by the A.D. is slighter where the biological demand is stronger. For the three situations dealing with the safety of persons the mean A.D. is .96; for all other situations it is 1.21.

however, attention should be called to two *biological* determinants which help to account for these variations. Women, it will be noted, justify killing in defense of personal honor more readily than do men. The biological basis is obvious; to a woman honor is readily associated with physical safety. (That there is in this result also a trace of the double standard of morality—a purely cultural influence—is, of course, not to be denied.) The second feature of interest from the biological point of view concerns the fourth item in the order of justification—the defense of one's country. In time of war or threat of war, the association of the honor of one's country with one's own physical safety is not hard to make. Propagandists who wish to precipitate war emphasize likewise in this connection the threat to the safety of one's family. Probably because of its close association with these prepotent items of physical safety, the defense of country follows them immediately in order of justification for homicide.

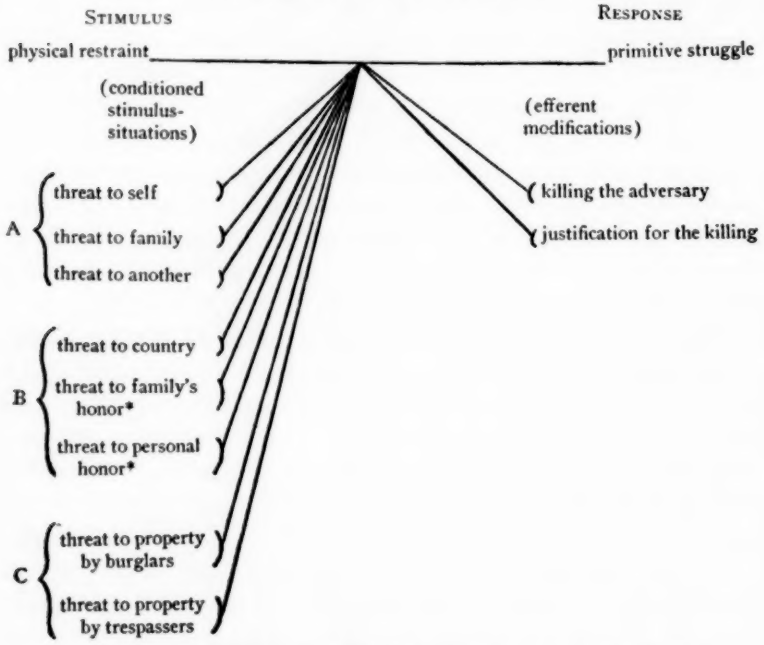
The two situations dealing with property come last in the series, but *burglary* is a more justifiable cause of homicide than *trespassing*. Burglary involves "breaking and entering" (approach to one's person and the stealing of articles closely associated with the self). Trespassing, on the other hand, although the monetary damage may be greater, is felt to be less of an encroachment upon personal integrity.

To express the matter in the language of William James, the Self is first and foremost a physical self; then in its process of extension, it embraces other living beings; then such relatively abstract conditions as "one's good name" and the honor of one's country or family. Next in order it embraces personal property, and last of all, surrounding property.

To sum up in the manner of the behaviorists, a schematic diagram (Fig. I) may be employed. The diagram does not, of course, imply that defense of property is learned *later* than defense of honor; genetically the order is generally the reverse. It is the *strength* of the conditioning which is here in question, not the historical steps in the recession of the stimulus. Ordinarily it is in adolescence that the impulse to defend one's honor becomes intimately associated with the threat to one's personal safety. Before adolescence property is often more effective as a conditioned stimulus in evoking physical combat.

FIGURE I

THE JUSTIFIABILITY OF HOMICIDE FROM THE POINT OF VIEW OF PREPOTENCY AND THE CONDITIONED RESPONSE



A = physical defense; B = defense of honor; C = defense of property
* Order of these two items reversed by women.

THE CULTURAL FACTOR

Since the origin of struggle-behavior seems so clearly to be instinctive self-protection, the rooting of these attitudes in biological soil must be admitted. Furthermore, the extension (learning) of new combative attitudes seems in many respects to follow a logic of biological significance; the more distant from the concerns of the self, the less justification is there for homicide.

But now the culturalist comes in for his innings. Is it not true, he asks, that culture is itself responsible for rendering one situation more immediately a "concern of the self" than another situation? What seems like good "biological logic" in one culture is often severely altered in another culture. Upon this indisputable fact the culturalist rests his whole case. Our results, he points out, are drawn from only one culture, and the biological argument should

not rest upon so one-sided a foundation.[8] Let this be admitted. For that matter, there are enough indications in our own results of cultural influence to make out a case for "social determination." These indications will be reviewed briefly before we attempt to formulate what seems to us a proper solution of the dispute.

In the first place it seems that cultural rather than biological considerations are primarily responsible for the precedence of honor-situations over property situations (with the exception of defense of country in the case of men, and of personal honor in the case of women, in both of which instances there is some actual relation to physical safety). It is not difficult to imagine a culture where the affront to one's possessions is resented more than an affront to one's name. It even happens in our own culture that an occasional miser or proud possessor of a race horse, a beloved auto, or prize strawberry patch defends his property more ardently than he would his good name. In these cases material goods have become identified with the Ego, and to defend them is to defend one's self. And yet the fact remains that in our present society honor is a more insistent value, *on the average,* than property. We may then conclude that cultural influences are to some extent responsible.

The variability in rank of the honor-situations is the greatest of the three. Not only are marked individual differences of opinion encountered (as shown by the A. D.'s in Table I), but the mean rank varies somewhat from year to year (as shown in Table II). The case of the defense of one's country is noteworthy. Actually the A. D. is so large in this instance that the average rank of fourth place is misleading. Many students placed it first (thus agreeing with the traditional teachings of patriotism and with the legal sanction); many placed it last (in line with modern pacifist persuasion). Here is clear evidence of the Fascist-Internationalist cultural conflict that is rending present-day society. In respect to this issue the variability of women is somewhat less than that of men. They are more uniform in placing the situation year after year in fourth place, and tend to show fewer individual differences of opinion. Perhaps

[8] Through the kindness of Mr. Thomas Farmer, of Duke University, the exercise was repeated with a group of 106 students from the South. The stable items in our data show the same ranking in Mr. Farmer's groups. Only within the unstable range of honor-situations was any "cultural difference" discernible. Students from the South tend to rank homicide in defense of the honor of family higher in justifiability than homicide in defense of country. It is proverbial that Nationhood has played a relatively weak part in the ideology of the South, and honor of family a prominent part.

young women are less interested than young men in the political issues involved, and therefore less susceptible to the conflicting influences of current events and propaganda; perhaps their relatively greater patriotism is due to the fact that in battle their own physical safety is not threatened. There seems here to be a combination of biological and cultural influences at work.

Another sex difference showing both influences is the higher position given to "honor of family" by men (chivalry) and "honor of self" by women (apparently by reason both of the double standard of morality and of the biological need for self-preservation).

The legal (cultural) sanctions for homicide correspond remarkably closely to the order of justification given by our judges on the basis of "personal feelings." The law respects the order of motives as they are established by both biological and cultural influences. In turn it quite clearly reinforces the personal judgment, for people who *know* the legal penalty for homicide are undoubtedly affected in their judgments of its justifiability. The only striking exception is the case of killing in defense of one's country. Here is the only instance where a killer does not have to stand trial. A medal is pinned upon him, and honor streams his way. But in spite of this legal encouragement people fail to agree completely with the law. The religious cultural pattern and the arguments of internationalists create a conflict which makes our subjects hesitate to endorse wholeheartedly the legal sanction for war.

Is Culture Alone Responsible for the Uniformity of Attitudes?

Writers often maintain that culture makes for *uniform* attitudes in a population, and that whatever *variability* is found can be traced to the selective effect of individual biological make-up. In some instances this statement seems true enough. For example, in our results offenses against honor turn out almost uniformly to be a more justifiable cause of homicide than offenses against property. This preference may be due to traditional codes of chivalry, or to the demands for social status in a complex society, or to ancient magical practice of identifying one's name with one's person. In any case it seems to be culturally influenced. In the Western world driving defense-attitudes are ordinarily aroused more readily by threats to honor than by threats to property. Whatever exceptions occur are culturally atypical and may usually be traced to individual differences of temperament or to personal idiosyncrasy.

On the other hand, uniformity in attitudes is produced *also* by biological needs. The essentially similar native equipment of human beings imposes certain identities of conduct upon them. Giddings pointed out long ago that as stimulation becomes more intense men act more like each other. In frigid climates all men seek protection by heavy clothing. When personal safety is threatened, men (with very few exceptions) struggle to defend themselves. In the case of immediate threat to one's physical safety variation in the response is limited. Ordinarily there will be struggle, with the logical outcome of homicide. When, however, the threat is more remote, as to one's honor or one's property, there are subtler forms of protection at hand: a letter to a newspaper, a libel suit, or recourse to the police; in these cases the restrictions of the biological factor are not so rigid. In short, although cultural influences undoubtedly tend to create "J-shaped" distributions of attitudes, it is unsafe to hold that such uniformity is due solely to institutionalization.[4] Our common humanity also makes for uniform attitudes.

So far as variability is concerned, it too may be a product of cultural *or* biological influences. In one cultural area pacifist ideals may prevail; in another, warlike ideals. In one family it may be customary for men fiercely to protect women; in another women may be expected to shift for themselves. Or the variability may be due to such purely personal (biological) traits as timidity, choler, shrewdness, vindictiveness, and despair.

In brief, it is impossible to ascribe attitudinal uniformity solely to cultural factors, and attitudinal variability solely to biological factors. The relationship between culture and personality cannot be stated so simply.

Where Do Attitudes Originate?

The experiment here described demonstrates the dual "origin" of attitude—in cultural patterns and in biological constitution. But it does more; it reveals that two entirely different meanings of the term "origin" are involved.

[4] For a demonstration of the standardizing effects of culture upon forms of response see F. H. Allport, "The J-Curve Hypothesis of Conforming Behavior," *Journal of Social Psychology*, 1934, V, 141-183; also *Institutional Behavior* (Chapel Hill, 1933). To establish his point the author selects cultural forms of conduct, such as punching time-clocks, liturgical practices, automobile-driving, and the like. But the pressure of man's instinctive needs, as the present article demonstrates, forces a similar skewness of attitudes. Man *must* both seek and justify sexual, nutritional, recreational, and protective forms of activity, even more urgently than he seeks and justifies conformity with cultural practices.

In the cultural sense an "origin" is nothing more than a field of stimulation from which a model of conduct is derived: mores, literature, parental example, textbooks, and propaganda all serve as "origins" of attitudes. But the confirmed sociologist and anthropologist leap somewhat unthinkingly from these social patterns to "personality," neglecting entirely the intervening psycho-biological level where *functional* origins are to be found exclusively. In effect, the culturalist says that the origin of the Eroica Symphony lay in the troubled times of the Napoleonic Era; the psychologist traces its origin to the conflicting emotions and turbulent imagery of Beethoven himself. Both contenders are right, but they are thinking on quite different planes.

Attitudes, such as we are here dealing with, are forms of readiness-for-response, and fall definitely within the psychological arena; they are motivational concepts.[5] Motivation is always psychobiological; it is always contemporary, and exists only within singular, specifiable individuals. The functional origin of any attitude is always in some pre-existing motivational core. To speak of this dynamic source of motive power as residing in the surrounding cultural pattern would be meaningless. As active or latent functional systems attitudes are exclusively of biological origin, traceable to (1) common instinctive needs, (2) peculiarities of individual inheritance, (3) transformations of these innate characteristics under the modifying influence of the environment into dynamic and personalized motives.

In achieving this transformation, the individual may or may not be affected by the cultural field of stimulation. If he is so affected, consciously or unconsciously, then his attitudes may be said to be "culturally influenced," but to say that the attitudes have a "cultural origin" creates sad confusion. No matter how vast the cultural *influence* may be, it never, psychologically considered, constitutes an *origin*.

Often a cultural pattern itself betrays its own biological basis. For example, the legal order of justifications for homicide follows closely the instinctive character of the motives. Likewise types of marriage, which, of course, are cultural forms, would not exist without their underlying biological motive. The elementary fact that all cultural influences have their root in some biological substratum is often overlooked by culturalists. This oversight is

[5] G. W. Allport, "Attitudes," *Handbook of Social Psychology* (Worcester, Mass., 1935), Ch. xvii.

responsible for the careless use of the short-cut expression, "cultural origin."

Men, of course, are not always aware of the biological rationale of the mores. They take the mores unthinkingly as their model, and their attitudes are enormously influenced by the dictates of custom. Starting with an inherited (biological) equipment the individual in the course of his adaptive behavior finds greater satisfaction by fulfilling his needs through imitation of surrounding (cultural) models. He demands food because of biological needs, and he finds these needs nicely met, let us say, by the institution of afternoon tea. He grows to *like* his tea, which means that in adapting his motives to the perscriptions of convention, he *transforms* his own motives until he finds that he is craving (through the "force of habit") the particular *form* of conduct in which he has learned to satisfy and express his needs. But it is nonetheless an *individual* motive. The *roots are biological;* the *influence is cultural;* the *motive is personal.*

Summary

An inquiry concerning the attitudes of students toward the justifiability of taking human life reveals unmistakably the biological (instinctive) basis of these attitudes. The prepotent struggle-response of infants, to which, in event of primitive emergency, adults too must revert, underlies all of the attitudes in question. The more primitive the situation in the biological sense, the more intense and the less variable is the attitude. The justification for other types of homicide is likewise in ratio to the psychological distance of the stimulus-situation from the guiding motive of self-preservation.

Cultural influences are demonstrable within this basic biological limitation. Due either to civilized codes or to the traditional "magic" associated with one's name and one's reputation, situations involving honor take precedence over situations in which property is an issue. Furthermore, the minor variability of the justifications from the point of view of sex differences, group differences, and time differences, demonstrates the operation of selective cultural influence.

Attitudes, like plants, represent primarily the unfolding of genetic determinants; they are subject, however, in a certain degree, to the "social topography" and "social climate" in which they develop. The *origin* of attitudes, in a functional sense, then, is always biological. The *model* upon which they are fashioned is often, though not always, cultural.

ABILITY TO INFLUENCE ONE'S SCORE ON A TYPICAL PENCIL-AND-PAPER TEST OF PERSONALITY*

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Criticism has been made of the questionnaire type of personality tests on the ground that a subject is inclined to underline or check the socially approved responses rather than those which actually describe him. This may result either from conscious effort on the part of the subject or from failure to see himself in true perspective because of rationalization or obliviscence of the disagreeable. The purpose of the investigation here reported was to measure the effect of a conscious attempt to influence scores on a pencil-and-paper test of the type in question. Although our experiment tells nothing about the amount of error ordinarily to be expected from the administration of the test under standard conditions, it does give an idea of extreme limits within which it is possible for subjects to fake their scores on one particular test.

The Stanford test of mental masculinity-femininity (M-F test) was chosen as the measuring instrument to be investigated. This test, which was developed in connection with an extensive research on sex differences in non-intellectual traits, consists of seven exercises with a total of 459 items and more than 1,500 possible responses.[1] Each item has been shown to be valid in differentiation

* This study was made possible by a grant from the Committee for Research on Problems of Sex, of the National Research Council. The work of collecting and treating the data was done by Kelly under the direction of Miles and Terman. This report was prepared by Kelly and Terman. L. M. T.

[1] The seven sub-tests include the following:

(1) A word association test of 60 stimulus words, each followed by four response words of which one is to be underlined as "going best with" the stimulus word.

(2) An association test similar to the preceding except that the stimuli are ink-blot drawings (21 items).

between men and women of unselected groups. The total score of the test is therefore an index of a subject's masculinity-femininity in interests and attitudes. The average score for unselected men is approximately + 60 and for unselected women — 60. There is usually an overlap of only about 10 per cent between the sexes. Since the possible range of scores is very wide, this test offers an excellent device for the present purpose. That the test was unknown to the subjects tested and that its nature was not suggested by anything on the test booklet were also desirable features of the test chosen.

The plan of the investigation was to give the same form of the M-F test (Form B) to the same group of subjects three times.

(1) The test was given to the group in the usual manner with no mention of the trait or traits measured by the test or of the purpose of the experiment.

(2) One week later and at the same hour the test was again administered to the same group. This time, however, the subjects were informed as to the nature of the test and as to the purpose of experiment by means of the following oral instructions.

You will recall that last week I gave you a test of interests and attitudes. The results on this test, which has been taken by more than 4,000 people, are proving of great importance. Comparisons are being made of people in various occupations and with various amounts of education. The relation is being found between scores on this test and all sorts of measures of interests and attitudes, hobbies, special aptitudes, health, and ability in performance. Different types are also being compared, such as physical types. Among these of special interest is a comparison between men and women, boys and girls. It seems that men and boys are apt to mark the test a certain way and women and girls in quite a different way. There seems to be a typical masculine reaction and a typical feminine reaction.

Now I want you to help me to find out how much wanting or trying to be a certain way or to belong to a certain type, such as a masculine or a feminine type, can influence the score. The question is, how masculine can a person be in his or her attitudes and responses if that

(3) An information test of 70 items, each with four responses from which the correct one is to be chosen.

(4) Ratings on the extent to which various things or circumstances arouse in the subject anger, fear, disgust, or pity (70 items), ethical ratings of 28 types of behavior, and expressed preference between seven pairs of activities (105 items in all).

(5) Likes and dislikes (119 items).

(6) Liking for historical characters (28 items), and acceptance or rejection of common beliefs (14 items).

(7) Items to the number of 42 selected from current tests of neurotic tendency and introversion.

is the main thing he or she is trying to be at that time; and in the same way how feminine one can make his or her responses if that is the chief aim.

Today I want you to coöperate with me in "testing the test" on this point. Those sitting on the right side of the room will note that there is a red arrow followed by an *M* on the front of their test blanks. That means that in filling out the blank today you people with the *M* on the blank, whether you are men or women, are to make yourselves test as masculine as you possibly can. Mark each item in the manner you imagine a hard-boiled extremely masculine he-man would mark it. Think of yourselves as regular hard-boiled fellows and mark the items as you would if you were these he-men.

Those sitting on the left side of the room will note a blue arrow followed by an *F* on the front of their blanks. That means that you with the *F*, whether men or women, are to make yourselves test as feminine as possible today. You are to mark each item in the way you imagine a dainty, extremely feminine, lady-like woman or girl would mark it. Try to think of yourselves as the most lady-like young things possible and mark the test as if you were real girlish girls.

Those who are marking the test today as a he-man would do it will have an opportunity to mark it as a woman next Tuesday. Remember we already have your score as you marked it naturally without trying to be different from what you are. Now I want to see how much you can influence it in each direction by your mental set. Your first score and the two scores resulting from these attempts to make yourself test masculine and feminine will be given you after you have completed the experiment next week. This is an important psychological experiment, and I want you to treat it seriously and to try to imagine yourselves either the very masculine man or the very feminine woman. Remember if your blank if marked *M* you are to make your responses just as masculine as possible, if it is marked F make it just as feminine as possible. Go ahead.[2]

The names of the subjects had been previously filled in on the blanks, and the blanks were so marked that half of the boys and half of the girls were to attempt to influence their scores in the masculine direction, while the other half of each group were to attempt to influence their scores in the feminine direction.

(3) The third administration of the test after another interval of one week was essentially identical with the second except that those who had tried to make feminine scores before were asked to make masculine scores, and vice versa.

The subjects from whom all three scores were available at the conclusion of the testing consisted of 52 junior college students, 19 men and 33 women. They were all volunteer subjects from classes

[2] All of the tests were administered by Dr. Kelly.

in elementary psychology and philosophy. Motivation was furnished by the promise to give the subjects all three scores at the conclusion of the experiment, and excellent coöperation was secured throughout.[3]

Possible influence of the result of practice in taking the same form of the test three times will not vitiate the results obtained, as the group was so divided that practice effects would be equal in the masculine and feminine directions. The three administrations were given at the same hour of the day. In view of the controlled condition of the experiment the shift of means must be interpreted as primarily the effect of a conscious attempt on the part of the subjects to influence their scores.

Although the chief aim of the investigation was that which has been stated, it will be noted that a number of other interesting questions may be answered by the data obtained: Are subjects able to shift their scores more in one direction than another? Is it easier for the more masculine than for the more feminine subjects to shift their scores in the feminine direction? Is the ability to influence one's score related to intelligence or school marks? Are there sex differences in these abilities?

Because of the amount of time needed to answer these and similar questions, it was necessary to limit the analysis to the total or gross scores on the M-F battery. It would be desirable to repeat the analysis for each of the sub-tests of the battery to determine whether all of them are equally susceptible to score faking or whether certain types of sub-tests are more open to vitiation from this source than others. Because of the lower reliabilities of the individual sub-tests, much larger populations would be necessary to answer this question than have been used in the present experiment.

The very fact that the M-F test is a sex difference test makes it necessary, except for certain group comparisons, to treat the data separately for men and women. In order to save space and also to simplify the reading of the tables and graph the following symbols will be used:

N-Score, the "naïve" score resulting from the first application of the test.

→ M-Score, the score made as the result of attempting to test as masculine as possible.

[3] The writers are indebted to Harry C. Steinmetz, instructor in psychology in the San Mateo Junior College, California, for his coöperation in supplying the subjects.

→ F-Score, the score made as the result of attempting to test as feminine as possible.

Difference → M, the difference between the N-Score and the → M-Score.

Difference → F, the difference between the N-Score and the → F-Score.

Difference M ←→F, the difference between the →M-Score and the →F-Score.

Th, the Thorndike Intelligence Test Score.

G. P. R., the grade point ratio (a grade of C being taken as 1.00).

TABLE I

DISTRIBUTION OF N-SCORES, → M.-SCORES, AND → F-SCORES OF 19 MEN AND 33 WOMEN MADE ON THE STANDARD M-F TEST

Score	N — Score		→ M — Score		→ F — Score	
	Men	Women	Men	Women	Men	Women
301 to 320	..	..	..	1	..	..
281 to 300	..	..	..	0	..	..
261 to 280	..	..	7	4	..	..
241 to 260	..	..	1	4	..	..
221 to 240	..	..	3	3	..	..
201 to 220	..	..	1	8	..	..
181 to 200	..	..	1	5	..	..
161 to 180	..	..	2	2	..	..
141 to 160	1	..	1	2	..	..
121 to 140	1	..	0	1	..	..
101 to 120	4	..	1	0	..	..
81 to 100	1	..	0	0	..	..
61 to 80	3	..	1	1	..	..
41 to 60	5	..	1	..	..	..
21 to 40	1	..	..	..	..	..
1 to 20	3	6	..	..	..	1
— 19 to 0	..	2	..	..	..	0
— 39 to — 20	..	5	..	..	2	0
— 59 to — 40	..	5	..	..	0	2
— 79 to — 60	..	3	..	..	2	1
— 99 to — 80	..	5	..	..	0	0
—119 to —100	..	5	..	..	2	4
—139 to —120	..	0	..	..	1	2
—159 to —140	..	1	..	..	6	1
—179 to —160	..	1	..	..	3	3
—199 to —180	..	..	..	..	1	6
—219 to —200	..	..	..	..	2	7
—239 to —220	..	..	..	..	..	4
—259 to —240	..	..	..	..	..	2
N	19	33	19	33	19	33
Mean	66.8	—56.2	208.8	189.1	—140.5	—147.6
σ Mean	9.0	8.4	15.8	16.3	11.9	10.9
σ Dist	39.2	48.1	68.9	93.9	51.8	62.6

The distributions of the N-Scores, → M-Scores, and → F-Scores are shown in Table I. The statistical significance of the differences revealed in Table I is shown in Table II for the boys and in Table III for the girls. From the data in these tables, it will be noted at once that the question whether or not subjects are able at will to change their M-F scores is emphatically answered in the affirmative. The differences are in fact very large.

TABLE II
SCORE CHANGES OF MEN
(N = 19)

	Mean	σM	Diff.-M	σDiff.	Diff. / σDiff.
1	2	3	4	5	6
Naïve Score	+ 66.8	9.00	142.0	16.47	8.62
——→ M-Score	+208.8	15.81			
Naïve Score	+ 66.8	9.00	201.3	14.21	14.17
——→ F-Score	—134.5	11.89			
——→ M-Score	+208.8	15.81	343.3	21.02	16.33
——→ F-Score	—134.5	11.89			
Difference ——→ M	140.9	14.91	60.7	19.25	3.15
Difference ——→ F	201.6	13.59			

TABLE III
SCORE CHANGES OF WOMEN
(N = 33)

	Mean	σM	Diff. M	σDiff.	Diff. / σDiff.
1	2	3	4	5	6
Naïve Score	— 56.2	8.37	245.3	17.21	14.25
——→ M-Score	+189.1	16.34			
Naïve Score	— 56.2	8.37	91.4	13.06	7.00
——→ F-Score	—147.6	10.90			
——→ M-Score	+189.1	16.34	336.7	20.44	16.47
——→ F-Score	—147.6	10.90			
Difference ——→ M	245.4	14.30	137.9	18.80	7.36
Difference ——→ F	107.5	12.50			

It will be noted that the boys were more able to influence their scores in the feminine than in the masculine direction, and that the girls were more successful in shifting their scores in the masculine than in the feminine direction. This difference is very large for both sexes, but somewhat larger for the girls than for the boys. The reason for this directional difference doubtless lies in the fact that there is more room for one to shift his score in the direction of the opposite sex. In spite of the fact that the women are able to shift their scores more in the masculine than the feminine direction, their absolute → M-Score is not quite as large as the → M-Score for the men. Similarly, the mean → F-Score for the men is not quite as large as for the women.

Table IV reveals no conclusive evidence of sex differences other than the expected difference in N-Score and the above-mentioned ability of each sex to shift the score more in the direction of the opposite sex. However, there seems to be a distinct tendency (955 chances in 1,000 that the true difference is greater than zero) for the men to be able to shift their scores more in the masculine direction than the women are able to shift theirs in the feminine direction. It is also very probable (987 chances in 1,000) that the women are slightly more able to shift their scores in the masculine direction

TABLE IV

SEX DIFFERENCES

	19 Men		33 Women				
	Mean	σM	Mean	σM	Diff.M	σDiff.	Diff. / σDiff.
1	2	3	4	5	6	7	8
Naïve Score	+ 66.8	9.00	— 56.2	8.37	123.0	12.29	10.00
⟶ M Score	+208.8	15.81	+189.1	16.34	19.7	22.73	.86
⟶ F Score	—134.5	11.89	—147.6	10.90	13.1	16.13	.81
Difference ⟶ M	140.5	14.91	24.5	14.30	104.9	20.66	5.07
Difference ⟶ F	201.6	13.59	107.5	12.50	94.1	18.46	5.09
Difference M ⟷ F	340.5	21.05	339.3	21.25	1.2	29.91	.04
Thorndike	70.3	3.36	65.4	2.40	4.9	4.13	1.20
G. P. R.	00.9	0.12	1.3	.10	.3	.16	2.08
Difference ⟶ M	140.5	14.91	.....	.....	33.0	19.45	1.69
Difference ⟶ F	.....	.....	107.5	12.50			
Difference ⟶ M	.....	.....	245.4	14.30	43.8	19.73	2.22
Difference ⟶ F	201.6	13.59	.....	.....			

than the men are able to shift theirs in the feminine direction. It is of course possible that these differences reflect some inherent characteristic of the test rather than a true sex difference.

Table V gives the Pearson product moment intercorrelations of the eight variables: N-Score, → M-Score, → F-Score, Difference → M, Difference → F, Difference M ⟷ F, Thorndike Score, and grade point ratio. Because of the small populations involved, the probable errors are all large, which, together with the fact that the values are all small or fairly so, makes the significance of any of the coefficients questionable. However, it is probable that the values of r_{12}, r_{15}, r_{25}, r_{27}, r_{28}, r_{34}, and r_{47} indicate a small but definite relationship for the men, and r_{15} a significant value for the women. The most probable relationship seems to be that shown by r_{15}, since it is over four times its probable error for both men and women. This means that there seems to be a tendency for both men and women with more masculine N-Scores to be more able to shift their scores in the feminine direction than those with less masculine N-Scores.

No marked relationship is to be found between the ability to shift one's score in the masculine direction and the ability to shift it in the feminine direction ($r_{45} = +.18$ and $+.04$); nor is there any relationship between these abilities and either the Thorndike score or the grade point ratio. Apparently the ability to influence one's M-F score is not the result of intelligence (within the range here tested) nor of the factors which are responsible for school achievement. None of the variables is correlated with age, although this may be due to the fact that the age range is very narrow (18 to 25 years).

It would be interesting to know what factors are accountable for the individual differences among subjects in ability to fake scores on a test of the kind in question. Since the ability to alter a score in this test requires a knowledge of the attitudes and interests of the opposite sex and also of the traits of other members of the same sex, it would appear that Difference M ⟷ F might reflect in a crude way the level of one's social adjustment or social intelligence, although no experimental verification of this assumption is at present available.

Although our results show conclusively that it is possible for subjects to alter their scores very significantly on the M-F test as the result of a conscious attempt to do so, this finding gives no

TABLE V

INTERCORRELATIONS

Upper figures in each block are for 19 men
Lower figures in each block are for 33 women

	→ M	→ F	D → M	D → F	DM ↔ F	Thorndike	G.P.R.*
1	2	3	4	5	6	7	8
N — Score.....(1)	+.42±.13	+.19±.15	−.24±.14	+.48±.12	+.23±.14	.00±.15	+.07±.15
	+.30±.11	+.20±.12	−.24±.12	+.52±.09	+.18±.12	+.22±.12	−.17±.12
→ M.....(2)	.....	−.27±.14	.....	+.44±.12	.....	+.40±.13	−.48±.12
	.....	−.18±.12	.....	+.30±.11	.....	+.17±.12	+.14±.12
→ F.....(3)	.....	.....	−.46±.12	.....	.....	+.02±.15	+.36±.13
	.....	.....	−.22±.12	.....	.....	−.01±.12	−.14±.12
Difference→M....(4)	.....	.....	.....	+.18±.15	.....	+.46±.12	+.06±.15
	.....	.....	.....	+.04±.12	.....	+.10±.12	+.26±.11
Difference→F.....(5)	.....	.....	.....	.....	.....	−.09±.15	−.32±.14
	.....	.....	.....	.....	.....	+.16±.12	.00±.12
Difference M↔F..(6)	.....	.....	.....	.....	.....	+.24±.14	−.17±.15
	.....	.....	.....	.....	.....	+.16±.12	+.15±.12
Thorndike.....(7)	.....	.....	.....	.....	.....	.....	+.26±.14
	.....	.....	.....	.....	.....	.....	+.09±.12

r67 = +.17±.15 for 52 men and women.
r68 = +.04±.15 for 47 men and women.
*Grade point ratios were not available for one man and four women.

intimation of the size of the actual errors when the test is normally administered to naïve subjects. Neither do the data at hand indicate to what extent like results would be found for other current paper-and-pencil tests of personality traits, such as dominance-submission, neurotic tendency, introversion-extroversion, emotional maturity, vocational interests, etc. The susceptibility of the various instruments to score faking can only be found by specific investigations of the individual tests. It seems probable, however, that large changes might occur on almost any test of this type, especially if the subjects are aware of its purpose. In order to reduce this source of error so far as possible, the M-F test has been labeled: Attitude-Interest Analysis.

SUMMARY

An investigation was undertaken to determine the ability of subjects to influence their scores on a typical paper-and-pencil personality test by conscious effort to do so. The test studied was the Stanford M-F test, which yields a score indicative of the mental

masculinity-femininity of the subjects tested. The results warrant the following conclusions:

1. Subjects of both sexes are able to shift their scores enormously in either the masculine or feminine direction as the result of instructions to do so.

2. Male subjects are able to shift their scores more in the feminine than in the masculine direction, and female subjects are able to shift theirs more in the masculine than in the feminine direction.

3. This ability to shift scores on the M-F test is not correlated with age, intelligence, or scholastic achievement. It is suggested that such ability may be related to the subject's level of social adjustment or social intelligence.

4. Although the data at hand do not indicate the actual errors that result in the usual administration of the M-F test, it at least seems advisable that subjects should be kept in ignorance of the nature and purpose of the test.

5. The susceptibility of other paper-and-pencil tests to intentional faking of scores should be investigated.

FACULTIES *versus* TRAITS: GALL'S SOLUTION

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Persistent protests like those of Symonds and others against treating "faculties" as functional unities[1] or traits of personality as real entities,[2] overlook an important distinction made more than a century ago by Franz Joseph Gall. The prevailing belief is that Gall was a characterologist by virtue of his craniology while his psychology was negligible, but this belief is controverted by the facts. The value of Gall's theories lies rather in his psychological conceptions, which have continued to languish in oblivion. We shall show that Gall's unique doctrine of faculties was his greatest psychological contribution and that, wholly apart from phrenology, it has value for the contemporary investigation of personality.

Gall as a Psychologist of Character

When Gall, about 1770, made his famous discovery that those of his schoolmates who had good rote memories also had prominent eyes, his interest was *physiognomical* rather than psychological. For Lavater soon afterward defined physiognomy as the study of "the exterior, or superficies of man, in motion or at rest";[3] and the exterior naturally included the skull, upon which the exertions of the later phrenologists were directed. But physiognomy offered no psycho-physiological theory to account for the connection between characterial qualities and external signs; its findings were mere enumerations of the correspondence. This defect led Gall to embrace a second interest which supplemented the first.

This second interest, which dates from 1785 or thereabouts,

[1] Charles Spearman, *The Abilities of Man* (New York, 1927), p. 37.
[2] P. M. Symonds, *Diagnosing Personality and Conduct* (New York, 1931), p. 22.
[3] J. K. Lavater, *Essays on Physiognomy,* trans. Thomas Holcroft (3rd ed.; London, 1840), p. 11.

was Gall's investigation of "the basis of the whole physiology of the brain." So stated, it was a *physiological* interest. It constituted a rejection of physiognomy as such[4] in favor of his theory of cerebral localization, which purported to explain external signs occurring on the skull as effects of the varying size of cerebral "organs" and hence varying intensity of their powers. This portion of his work comprised anatomical identification of the 27 cerebral "organs" of the 27 faculties, together with formulation of the thesis that all mental manifestation is determined wholly by the brain as the efficient center of the nervous apparatus.

The third interest developed hand and hand with the second, and was centered in the *psychological* problem of identifying and classifying the functions that constituted all mental activity. It is with this third problem, which has been most neglected in previous accounts of Gall, that we are here concerned. A very recent allusion to it informs us simply that "Gall's psychology was just as primitive as his physiology,"[5] and Symonds asserts that "the 'mental faculties' on which the system is based have long since been shown not to exist."[6] In comparing such statements with the facts, one should remember that Gall was often misrepresented by his pupil Spurzheim, and also that phrenology, the cause of most of the criticism, was irrelevant to his psychological views. The one need not involve the other. That this fact was formerly acknowledged by at least one psychologist is shown by Sibbern's comment in 1856 that Gall's "so-called cranioscopy forms only a secondary part" of his psychophysiology.[7]

Gall's general psychological formulations are embodied in six principles that became known as "Gall's laws." Two of these are the purely craniological hypotheses that the size of a cerebral "organ" is a measure of its power, and that the exterior of the skull conforms in general to the shape of the brain. The other principles, which are psycho-physiological, Gall stated in these words:

> The moral and intellectual dispositions are innate; their manifestation depends on organization; the brain is exclusively the organ of the mind; the brain is composed of as many particular and independent organs,

[4] F. J. Gall, *On the Functions of the Brain and of Each of Its Parts, etc.*, trans. Winslow Lewis, Jr.; ed. Nahum Capen (6 vols.; Boston, 1835), V, 261.

[5] R. Müller-Freienfels, *The Evolution of Modern Psychology*, trans. W. Béran Wolfe (New Haven, 1935), p. 165.

[6] Symonds, *op. cit.*, p. 505.

[7] F. C. Sibbern, *Psychologie, indledet ved almindelig Biologie i sammentraengt Fremstilling* (3rd ed.; Copenhagen, 1856), p. 56.

as there are fundamental powers of the mind,—these four incontestable principles form the basis of the whole physiology of the brain.[8]

These formulations raised a number of problems that have always existed in psychology, although they turned aside from other problems to which psychologists have attached great significance. In the one case there is the problem of reducing manifestations of mental powers to their radical principles, or of *analyzing mentality as empirically observed*. To the neglected class of questions belongs the problem, prominent in the tradition of Locke, of relating conscious phenomena to the environment. Since Gall was seeking to discover the functions of the brain rather than to account for the elaboration of subjective states, the latter problem, of perception, became for him distinctly secondary to that of the function of the innate "fundamental powers of the mind." In other words, while the sensationalistic psychology of the early nineteenth century was empiricistic, static, phenomenological, and normative,[9] Gall's psychology was nativistic, dynamic, objective, and concrete.

To say this is at once to identify Gall as a *psychologist of character*. His first, physiognomical interest, having found an ally in physiology and psychology, could best be developed by framing a scheme of psychology that was based upon the objective data derived directly from observation of particular individuals in life situations. Such procedure was indeed forced upon Gall by his assumption of *correlation* between behavior and its multiplex seat in the brain. If many powers were to be localized, different individuals must show significant differences in particular powers, both in respect to cerebral formations and behavioral manifestations. Gall therefore devised a controlled technique which consisted in observing "all the faculties in their *excessive* activity"[10] as manifested in "persons who were distinguished from other men by some eminent quality or faculty";[11] in the method of "counter proof" with persons deficient in the quality;[12] and in assembling "many facts, observed under varied circumstances."[13] The persons especially distinguished were chosen because "I easily perceived that it was only in such individuals that I could find striking differences of the head, and that I

[8] Gall, *op. cit.*, VI, 308.

[9] As employed in the present discussion, this term designates universal *uniformities* in contradistinction to *individuating qualities*. It does not, however, signify moral appraisal or *ideal* qualities.

[10] Gall, *op. cit.*, IV, 1.

[11] *Ibid.*, III, 26.

[12] *Ibid.*, III, 112.

[13] *Ibid.*, III, 107.

could distinguish well-marked protuberances."[14] The belief in cerebral organs and their attendant "protuberances" may be ignored, once the psychology Gall built upon it is inaugurated; falsity of this belief cannot affect the psychology as such. The significant point to be taken from this account of Gall's method is the fact that both problem and method obliged him to develop at the outset a full-fledged *psychology of character.*

It was as a psychology of character that, in the words of Murphy,[15] Gall's "scheme was diametrically opposed to the association psychology of the period." In so far as association psychology approached the problem of character at all, either then or later, it was by the *reverse* procedure of abstracting individual differences from a normative, or generally uniform, scheme of mind. J. S. Mill's proposed science of character, which he called "ethology," was in this way conceived as a purely *deductive* discipline.[16] During his lifetime Gall stood alone in representing the inductive psychological investigation of character in concrete situations, and he thus anticipated by a full century an approach that is only now being established by the study of personality. The framework for the total individual that Gall depicted was provided by the twenty-seven "fundamental faculties," which were at once the radical powers of mind and the basis of characterial differences. These faculties as Gall conceived them furnished a wholly original type of units of character. We shall see how they established a precedent.

The Doctrine of Attributes and Faculty Psychology

As has been said, Gall shared with other psychologists, of all periods, the problem of identifying the functional unities that were manifested in the conduct of individuals. This problem must receive at least a provisional solution whether one is making an exhaustive analysis of mind, as the faculty psychologists did, or grouping the items of a test so as to bring out phenomena of a given class, or determining the qualitative nature of traits of personality. Until it is solved investigations along these lines cannot proceed; when attempts to solve it fall short of perfection, the cry is nowadays raised that that noisome and grievous error, a return to

[14] *Ibid.*, III, 26.
[15] G. Murphy, *An Historical Introduction to Modern Psychology* (London, 1929), p. 55.
[16] J. S. Mill, *A System of Logic, Ratiocinative and Inductive* (London, 1843), Bk. VI, Ch. V, Sec. 4.

"faculties," has been committed. Gall was entirely aware of the difficulty of the task. The novelty and force of his solution lay in the formation of a single principle by which he could separate all manifestations of mind into two classes, and this principle was the cornerstone of his psychology. The items in one class he called "fundamental" faculties, while those of the other he regarded as "modifications" or "attributes" of the fundamental faculties. In developing this thesis he parted company with all other faculty psychologists.

When he first essayed to establish his physiology of the brain by localizing its mental functions, Gall quite naturally turned for assistance to the psychologists, to Condillac, Malebranche, de Tracy, Bonnet, Wolff, and others whose views were well known in Germany and France. In such systems he found numerous faculties that were believed to be the basic powers of mind. These included among others "understanding, will, sensibility, desire, voluntary motion, intelligence, reason, imagination, liberty, thought, sentiment, attention, comparison, memory, judgment, reflection, preference." But he soon discovered that such faculties were worthless for his purposes because they were too abstract, too generalized, and not distinctive of character. Any one of them might, on the one hand, enter into nearly any kind of behavior. But their inadequacy is just as prejudicial from the point of view of *character*, since they are normative[17] rather than distinctive. These generally accepted faculties, as Gall put it, were not "determinate." "We nowhere find," he wrote, "that a man or a woman has become celebrated by the understanding and the will, by attention, comparison, desire, liberty, etc. . . . We need faculties, the different distribution of which shall determine the different species of animals, and their different proportions of which explain the difference in individuals."[18] His own list of twenty-seven "determinate" faculties or "radical powers" ultimately provided him with mental qualities in which individuals differed and which also served as the constitutive powers of mind.

Gall could not well deny the fact that the mind performed the functions denoted by the kind of faculties that he rejected as being not determinate. He therefore admitted their existence, but gave them the systematic rôle of *general attributes* of the true fundamental faculties. He concluded that each of the 27 determinate faculties was modified to a greater or lesser degree by all these attri-

[17] See note 9.

[18] Gall, *op. cit.*, I, 87-88.

butes, most often citing specifically the functions that were more important in the history of psychology, such as perception, attention, memory, and imagination. These functions are prominent in the list of faculties that Spearman found to be preferred at the present time.[19] As attributes, Gall stated that they were essential to each of the fundamental faculties when the latter "are graduated to the power or ability to create—to that which we call *genius*. When they are weak, there is a feeble degree of attention, of perception, of memory, a defective judgment, and no imagination."[20] According to the doctrine of attributes, then, the true basis of mind and character lay in the intensity of the 27 determinate faculties, which are listed below; and the general scope or breadth of mind was shown by the extent to which the attributes modified particular faculties.

Another systematic feature of the doctrine of attributes, besides this separation of mental qualities into two coördinate classes, was the "neutrality" of the determinate faculties in respect to cognition, affection, and conation. That is to say, none of the determinate faculties belonged of itself to either category, while at the same time every one belonged to all three. Gall's "sentiment of property," for instance, despite its name, was not peculiarly an *affective* faculty. At its full intensity it required the cognitive attributes of perception, memory, etc., so that the individual might recognize his own property; similarly it required affective modification, e.g., by desire. Conation might enter into the tendency to steal; over and above conative attributes, all the determinate faculties were originally defined as dynamic qualities. It must not be thought that Gall discussed the various subjective phenomena in these terms when laying down the principle; he was too much of a "behaviorist" to be concerned with consciousness as such. The introspective terms are introduced here in order to facilitate comparison of Gall's scheme with introspective faculty psychologies.

Before passing to such comparison, we must caution the reader that no determinate faculty appears to have been defined by Gall in subjective terms. His "sentiment of property," just mentioned, is a case in point. As may be seen in the comparative table, Gall often called his determinate faculties "sentiment of————," "sense of ————," "memory for————," etc.; but he never intended to suggest that faculties so named were fragments of general affection, sensation, or memory, for these general qualities were attributes

[19] Spearman, *op. cit.*, p. 32. [20] Gall, *op. cit.*, III, 83.

only. The usage is comparable to our term "sense of humor," which does not refer to the psychological category of *sensation.*

Gall had nothing in common with psychologists of the Wolffian tradition. They analyzed mind into what Gall called *general attri-*

COMPARATIVE TABLE OF FACULTIES

THOMAS REID, 1780	DUGALD STEWART, 1827	FRANZ JOSEPH GALL, 1810
Active Powers	*Active Powers*	*Determinate Faculties*
Self-Preservation		
Maintenance of Habits	Propensity to Action and Repose	
Hunger and Thirst	Hunger and Thirst	
Lust	Sex	Instinct of Generation (1)
	Acquired Appetite for Drugs	
	Desire of Society	
Instinct of Imitation	Instinct of Imitation	Mimicry, Imitation (25)
Language		Verbal Memory (14)
Desire for Power	Ambition	Vanity, Ambition (9)
Self-Esteem	Self-Love, Self-Confidence	Pride, Self-Esteem (8)
Desire of Knowledge	Desire of Knowledge	Educability (11)
Confiliate Affection	Parental Affection, Filial Affection	Love of Offspring (2)
Gratitude	Gratitude	
Pity and Compassion	Pity, Sympathy	
	Universal Benevolence	Good Nature (24)
Esteem of the Wise and Good	Desire of Esteem	
	Veracity	
Friendship	Friendship	Friendship, Attachment (3)
Sexual Affection	Sexual Affection	
Public Spirit	Patriotism	
Emulation	Desire of Superiority	
Animal Resentment, Rational Resentment	Resentment	Courage, Self-Defence (4)
Transcendent Good	Interest	
Duty	Sense of Duty	
Veneration	Veneration	Theosophy, Religion (26)
	Hope	
	Decency, Regard to Character	Firmness of Character (27)
Imagination (—invention)	Imagination	Poetry (23)
	Instinct for Construction	Mechanical Aptitude (19)
	Sense of Similarity and Contrast, Sense of the Ridiculous	Wit (22)
Beauty	Memory for Colors	Sense of Colors (16)
	Time	
	Music	Music (17)
		Wish to Destroy (5)
		Cunning (6)
		Sentiment of Property (7)
		Cautiousness (10)
		Mathematics (18)
Intellectual Powers	*Intellectual Powers*	
The Five Senses and Their Faculty of Perception	The Five Senses and Their Faculty of Perception	
	Form	Memory for Persons (13)
Size and Novelty	Size, Novelty	
	Locality	Local Memory (12)
	Language	Memory for Languages (15)
Memory	Memory	
Judgment and Reason	Judgment and Reasoning	Comparative Sagacity (20)
Abstraction	Abstraction	Metaphysical Depth (21)
Conception	Conception	
	Attention	
Moral Taste	Moral Taste	
	Association of Ideas	

Sources: Thomas Reid, *The Works of Thomas Reid*, ed. Sir William Hamilton (2 vols., 8th ed.; London, 1895); Dugald Stewart, *Elements of the Philosophy of the Human Mind*, ed. Sir William Hamilton (3 vols., 2nd ed.; Edinburgh, 1877); and F. J. Gall, *On the Functions of the Brain and of Each of Its Parts, etc.*, trans. Winslow Lewis, Jr., ed. Nahum Capen (6 vols.; Boston, 1835).

Gall's numbering of the faculties is in parentheses; he alone used numbers.

butes and not into determinate faculties, and they were not interested in mental qualities as individual differences. Moreover, some of these continental psychologists were turning away from faculties in the course of espousing sensationalism, the French form of British associationism during Gall's lifetime. Gall had even less in common with the last group, for as has been indicated, his fundamental approach was totally foreign to Locke's brand of empiricism.

At the close of the eighteenth century, however, there flourished in Scotland a brand of faculty psychology that bore a striking nominal resemblance to Gall's scheme. For this reason the comparative table is here appended, showing the faculties as listed by Thomas Reid, Dugald Stewart, and Gall. Some rearrangement of order was required to give corresponding faculties the same relative position in each list.

The principal difference between Gall's and the Scottish lists may at once be seen in the inclusion by Reid and Stewart, under "intellectual powers" (faculties of the understanding), of mental functions that Gall rejected from his choice of faculties as *general attributes.* The whole of the resemblance therefore appears in that portion of the Scottish lists which contains the "active powers" (faculties of the will). Thus the Scottish faculty psychologists ranged active and intellectual powers, in Gall's terminology "determinate faculties" and "general attributes," *side by side,* instead of treating them, in the manner of Gall, as a system of *rectangular coördinates.* This fundamental difference destroys much of the superficial resemblance.

The Scottish faculty psychology, moreover, was *introspective;* its analysis of mind into faculties was supposed to be an introspective procedure. As a result, the Scottish "intellectual powers" were *cognitive* faculties alone, and the "active powers" were *affective and conative.* (The latter combined category, which survives in the German *Gemüt,* was generally accepted up to the time that Tetens in Germany and Thomas Brown in England differentiated feeling or emotion as a category distinct from volition.) In other words if perception, for example, entered into the expression of some active power in the Scottish scheme, the relation between the two had to be thought of as *additive* instead of *coördinate* as with Gall. This circumstance acquires added significance on the level of *character.* Stewart, who contributed a chapter on character,[21]

[21] Dugald Stewart, *Elements of the Philosophy of the Human Mind,* ed. Sir William Hamilton (3 vols., 2nd ed.; Edinburgh, 1877), Vol. III, Part 3, Ch. I.

described it by combining separate references to "intellectual" character and "moral" character. No single Scottish faculty could of itself *represent character as a whole,* whereas in this systematic sense any of Gall's faculties could be regarded as a "unit" of character.

The essential differences between Gall's and the Scottish faculty psychology were reflected historically for almost a century in the use of the Scottish method by those nineteenth-century psychologists who employed facultative conceptions of characterial components. Samuel Bailey[22] retained Stewart's distinction between intellectual and moral character, and Bain's approach[23] was similar. It was not until Shand, in agreement with McDougall[24] defined instincts as the active properties of "sentiments"[25] that anything like Gall's treatment of character again appeared. When it did appear in Shand's system, a virtual *doctrine of attributes* reappeared with it, for Shand held that "an emotion includes (1) a cognitive attitude, (2) a conative attitude, and (3) a feeling-attitude," and that "an emotion is, then, a self, or microcosm, of the entire mind; and this, as we shall see hereafter, is still truer of a sentiment."[26] Shand adds that "such a personification of emotions and sentiments does not falsify their nature, so long as we do not attribute to them qualities which they do not possess,—so long as we do not confuse them with the total self to which they belong."[27] Shand did not attempt to give a concise enumeration of the faculties constituting mind or character, but still he appears to have recovered, by a very different method, many of the essentials of Gall's psychology.

Since Gall has often been accused of uncritically borrowing the conceptions of others, it is pertinent to examine the charge and the facts concerning it. The comparative table suggests that Gall might have made some use of Reid's work, which was published before Gall's books were written. Yet it seems that Gall had no knowledge of the Scottish faculty psychology. Two of his French critics, Lélut in 1836 and Garnier in 1839, called attention to the nominal

[22] Samuel Bailey, *Letters on the Philosophy of the Human Mind,* First and Second Series (London, 1855 and 1858).

[23] A. Bain, *On the Study of Character, Including an Estimate of Phrenology* (London, 1861).

[24] William McDougall, *Psychology the Study of Behaviour* (London, 1912), p. 113.

[25] A. Shand, "Character and the Emotions," *Mind,* 1896, n.s., V, 218.

[26] A. Shand, *The Foundations of Character* (London, 1914), p. 64.

[27] *Ibid.*

similarity, Garnier constructing a table similar to ours. But Lélut held that Gall did not know of the Scottish work,[28] and Garnier, in concurring, added that Gall's intent was to controvert the "narrow and false psychology of the French philosophers of the 18th century, with which he was alone acquainted."[29] In any event, the charges against Gall are contentions that he borrowed, not from Scottish faculty psychology, *but from the continental faculty psychology which he explicitly repudiated!* This fantastic notion, which may have begun with Johannes Müller,[30] was developed by Wundt, who called Gall's psychology a "caricature of the (Wolffian) theory of faculties,"[31] and repeated by James.[32] In explanation of the attitude of Müller, Wundt, and James, it should be stated that they quote not Gall but Spurzheim, whose "psychology" was indeed primitive and a caricature, with the result that "Gall had to suffer for Spurzheim's errors."[33]

It is not unlikely that the popularity of phrenology had something to do with the well-nigh unanimous decision of modern psychologists to denounce all faculty doctrines, at least in name. Yet Gall's faculty doctrine was radically different from that of the later phrenologists and from that of the "faculty" psychologists.

Faculties, Factors, and Traits of Personality

Because Gall's scheme coördinated generalized mental functions with determinate dispositions, it brought into one system normative capacities and characterial qualities which are mutually incommensurable in any uni-dimensional system. Any determinate faculty was consequently more than an inner replica of a corresponding mental state or manifestation, for it denoted a *directive* force rather than the bare *possibility* of action to which a faculty was limited by the classical definition.[34] The normative capacities, Gall's *general*

[28] L. F. Lélut, *Qu'est-ce que la phrénologie?* (Paris, 1836), p. 361.

[29] Adolphe Garnier, *La psychologie et la phrénologie comparées* (Paris, 1839), p. 38.

[30] B. Hollander, *In Search of the Soul and the Mechanism of Thought, Emotion, and Conduct* (2 vols.; London, 1920), I, 365.

[31] W. Wundt, *Essays* (2nd ed.; Leipzig, 1906), p. 148.

[32] William James, *Principles of Psychology* (2 vols.; New York, 1890), I, 27.

[33] Hollander, *op. cit.*, I, 343. Johann Gaspar Spurzheim (1776-1832) was Gall's first pupil. Before Gall was ready to publish, Spurzheim left him to go to England, where he issued many popular works: *The Physiognomical System of Drs. Gall and Spurzheim* (London, 1815) and *Phrenology, or the Doctrine of the Mental Phenomena* (London, 1825). It was he who publicized phrenology under that name, which Gall never used, after Forster suggested it in 1815.

[34] Christian Wolff, *Psychologica empirica methodo scientifica pertractata* (Frankfort and Leipzig, 1732).

attributes, which corresponded to the classical faculties, were the instruments of these dispositions, their efficiency in each particular instance varying with the intensity of the disposition they modified.

The promising implications of this depiction of individuality have a direct bearing upon present-day issues in the psychology of personality. The chief issue is still the problem of characterizing psychologically the aspects of personality in which individuals may differ. Stern states that "in present-day psychology the concept of disposition occupies the place of faculties,"[35] and goes on to describe the two ways in which any disposition may be thought of, distinguishing (but not separating) a "directional aspect" and an "instrumental aspect." The former characterizes intellect, inclinations, and interests; the latter such qualities as intelligence and temperament.[36] In terms of dispositions as described by Stern, Gall's faculties exemplify the *directional* aspect. When we consider that his general attributes furnished the faculties with their capacity by modifying them, we may see in these attributes Stern's instrumental aspect.

This instrumental aspect, or in Gall's language, the general attributes of the determinate faculties, especially since it characterizes *intelligence,* may be identified in the theory of *general factors* as described by Spearman. When Spearman, who is conspicuous as an opponent of faculties, measured mental ability by the factor method, he found that intercorrelations of "separate" abilities did not yield "unitary functions" in the sense of independent "faculties." Instead, the abilities had so much in common that they had to be described collectively by one *general factor,* called *g* for cognitive ability, or when conative processes were measured, *w,* with the overflow added in certain cases as *special factors* denoted by *s.* But when one examines the "faculties" abolished by Spearman's results, one cannot avoid the conclusion that Gall would have predicted this very outcome *while retaining his twenty-seven faculties!* For Gall declared the faculties which Spearman asserts are "typical" of modern psychology, "judgment," "memory," "invention," "attention," etc., to be but "so many abstract notions," having no proper existence.[37] Consequently Spearman's complaint against faculties, a complaint with which Gall is in agreement, refers to the *general*

[35] W. Stern, *Allgemeine Psychologie auf personalistischer Grundlage* (Hague, 1935), p. 418.
[36] *Ibid.,* p. 792.
[37] Gall, *op. cit.,* III, 84.

attributes, and need not apply at all to the notion of "determinate" faculties.

Since *g* is akin to "general intelligence," and since the intercorrelations on which it is based are measures of general attributes (in Gall's terminology), *g* represents the aggregate capacity of cognitive attributes that are not distinct from one another. In so far as there is an added margin of "multi-focal" capacities, these emerge in a few "exceptional cases" as special abilities; in Gall's scheme they would represent general attributes as distinguishable from one another and from the total qualification which general attributes place upon "determinate" faculties. These special factors, in other words, do not correspond to Gall's determinate faculties; they still come under the heading of general attributes. So when Spearman asserts that such factors afford the only means by which "those who claim to measure 'special abilities' can be saved from the charge of living in the fool's paradise of 'faculties' "[38] his reference again applies solely to the kind of faculties that both Gall and Spearman reject, for these appear to be the only kind that factor analysis could possibly reveal.

In this state of affairs, is not Spearman in a sense guilty of committing the same fault he derides? If there is any justification for equating *g* with "cognition" or with "cognitive ability," and *w* with "conation," then the unitary function *g* or cognition becomes *one faculty* in place of the many that it abolishes; because it is single it does not become any more *representative* of total mentality; and the same is true of *w* in the category of conation. In depicting character as constituted by determinate faculties Gall avoided the cleavage into cognition, conation, and affection; cognitive, conative, and affective capacities or qualifications of any sort were alike *attributes.* The independence he ascribed to the determinate faculties was of a different order which cut across the classical cleavage. While *g, w,* and any other general factors, with their subsidiaries, the special factors, remain *supplementary* to each other and uncoördinated with dispositions that adequately express qualitative differences between individuals, they are simply enlarged "faculties" *of the type of general attributes.* If these general factors are held to exhaust mentality, factor analysis comes perilously near to the position of those attacked by Gall, and by Spearman after him.

Whether or not factor analysis succeeds in escaping from the

[38] Spearman, *op. cit.,* p. 222.

predicament of classical and continental faculty psychology, it is clear that it is equipped to deal with "attributes" only, and that it affords no satisfactory approach to the kind of characterial differences described by Gall's determinate faculties. Is there, then, some other present-day approach to the problem that is comparable to Gall's direct approach by way of determinate faculties after the avenue of attributes was rejected?

Such approach is to be found in the theory of *traits of personality,* wherein traits are regarded as "units or elements which carry the distinctive behavior of a man"[39] in his various spheres of interest and activity. This conception is fundamentally different in aim and purport from the notion of mental factors, which as we have seen describes only individual variations in the attributes that qualify characterial dispositions. As Pratt puts it, such attributes are "mental capacities distributed along quantitative continua and revealed phenomenologically as act-qualities."[40] Traits of personality, while modified by these capacities, do not *result* from them and are aligned along another dimension of psychological organization. As Allport has said, "there is a world of difference between ascendance, expansiveness, extroversion, and Sensation, Will, and Reason."[41] In the contrast so stated we find at the outset an echo of Gall's demand for "determinate" faculties as opposed to general attributes for the purpose of characterizing individual natures.

While it must be observed that Gall's theory outran his practice to some extent, with the result that his 27 faculties were all of the same order rather by definition than according to usage, it will become evident that half, or fourteen of these faculties, are clearly complex unities of the sort denoted by the above definition of traits. These faculties were grouped by Walter under the heading of "expressly characterial qualities," as distinguished from the rest of Gall's faculties, which he grouped under "talents" and "intellectual abilities."[42] The fourteen *expressly characterial qualities,* viewed in the light of Gall's extensive description of these faculties,[43] are the following (Gall's numbering is reproduced):

[39] G. W. Allport, "What Is a Trait of Personality?" *Journal of Abnormal and Social Psychology,* 1931, XXV, 368.

[40] C. C. Pratt, "Faculty Psychology," *Psychological Review,* 1929, XXXVI, 171.

[41] G. W. Allport, "Review of P. M. Symonds' *Diagnosing Personality and Conduct," Journal of Social Psychology,* 1932, III, 396.

[42] F. K. Walter, "Die materiellen Grundlagen der geistigen Persönlichkeit," *Jahrbuch der Charakterologie,* 1924, I, 355-375.

[43] Gall, *op. cit.,* III-V.

(1) Instinct of Generation
(2) Love of Offspring
(3) Attachment, Friendship
(4) Instinct of Self-Defence, Courage
(5) Carnivorous Instinct, Wish to Destroy
(6) Cunning
(7) Sentiment of Property
(8) Pride
(9) Vanity
(10) Circumspection, Cautiousness
(22) Wit
(24) Goodness
(26) God and Religion
(27) Firmness

It will be noticed at once that in contrast with current practice in designating traits of personality, the names of these determinate faculties are more designed to suggest the motive force at the bottom of the various tendencies, than merely to describe the quality manifested as is the case with the traits previously mentioned, "ascendance, expansiveness, and extroversion." This difference is partly due to the fact that Gall intended his faculties to be the constituents of *both* mind and character, while modern psychologists of personality make no such claim for traits.

That the fourteen faculties here listed correspond to *traits* under at least one leading conception of traits, is revealed by testing them with the eight criteria for a trait proposed by Allport.[44] They definitely satisfy the first six of these criteria, viz.: (1) a trait has more than nominal existence; (2) a trait is more generalized than a habit; (3) a trait is dynamic, or at least determinative; (4) the existence of a trait may be established empirically or statistically; (7) acts, and even habits, that are inconsistent with a trait are not proof of the non-existence of the trait; and (8) a trait may be viewed either in the light of the personality which contains it, or in the light of its distribution in the population at large. The remaining two criteria, the satisfaction of which by Gall's faculties is somewhat more doubtful, are: (5) traits are only relatively independent of each other; and (6) a trait of personality, psychologically considered, is not the same as a moral quality.

In the case of the fifth criterion Gall stressed independence of faculties, but often wrote as if they were highly interdependent by emphasizing "organization" of character. As for the sixth, Gall evidently supposed that some faculties *did* correspond to moral qualities generally recognized in his time, although there is little reason to believe that he held such correspondence to be a necessity.

[44] G. W. Allport, "What Is a Trait of Personality?" *Journal of Abnormal and Social Psychology*, 1931, XXV, 368-372.

We find, then, that those of Gall's faculties which Walter called "expressly characterial qualities" (and perhaps some others as well) correspond in all essentials to traits of personality as characterized by Allport. The fact that Gall made of his faculties something *more* than traits enhances rather than diminishes their qualifications for discharging the function of traits in psychology. As Gall described them, they can do no *less* than discharge this function, which is to substantiate *consistent* orientations of personal conduct in which individuality is centered. In outlining his method, in rejecting the primacy of normative capacities, in describing the particular faculties by their manifestation in many areas of behavior, Gall emphasized the consistency imparted to character by a dominant faculty. It was this feature of character, it will be recalled, that first drew his attention to many of the problems he attacked. In consequence of a given organization of determinate faculties, character, he wrote, "remains at bottom the same, however the objects which interest us change with age and the social relations. . . . When I observe what a person sets a value on, or despises, praises, or excuses; what events interest him; what society he seeks; if I see him act especially on occasions where there are conflicting interests; . . . the whole man is unmasked before me."[45]

The bearing of Gall's work on present problems and disputes in the psychology of personality may thus be identified by the functional correspondence between his determinate faculties and traits of personality. The present situation is surprisingly similar in its alignments to the situation in psychology at the time Gall carried on his investigations, if allowance be made for the absence in the latter case of such procedures as experimentation and quantitative measurement. Some of the faculty psychologists were beginning to abandon faculties in favor of unified divisions of mind, which appears to be substantially what the factor school is doing today. Others, in Herbart's circle, were multiplying states of mind by dividing the old faculties until the resulting scheme of mind was a conglomeration of numberless *specific* tendencies, each appropriate to its own peculiar situation. This trend may be compared with the position taken by the opponents of *consistency* in personality, who no less than the supporters of factors join the chorus of protest against "faculties" whenever *traits* are mentioned. Between the associationists and the "apperceptionists" stood Gall with his unique faculty

[45] Gall, *op. cit.*, III, 114.

doctrine, analyzing character into determinate, representative functional units, and giving all mental processes not directly involved in these distinctive marks of individuality the status of general *attributes*. Does not the doctrine of traits, as far as it goes, occupy the same ground?

All those theorists in either of the first two traditional camps, who illicitly confuse traits with "faculties" by not distinguishing the two great classes of faculties differentiated by Gall—determinate faculties and general attributes—and who thus seek a blanket provision for abolishing a seemingly fruitful conception, are attacking not their opponents *but their own historical forbearers*. If they wish to accomplish more than this by the method they have adopted; if, specifically, factor analysis is to do more than demonstrate merely that *general attributes* function collectively rather than as separate processes; they must first reckon with the precedent established by Gall and recognize the import of his theory of determinate faculties modified by general attributes. According to this doctrine, the "faculties" of faculty psychology, like modern "factors," were *attributes*. But Gall's "determinate faculties" were conceived as traits of personality are now conceived, and furnish a precedent for the doctrine of traits.

DYNAMICS OF THE GESTALT PSYCHOLOGY
PART I

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It is one of the many merits of the Gestalt psychologists that they do not avoid the more interesting problems confronting the student of human nature by the simple device of repudiating all responsibility for explanation in favour of a program of mere description. They bodily claim to seek explanation of all mental processes and of the expressions of those processes in bodily behavior; in other words, they seek to understand the causation of all such events.

Following the example of the physicists, the G. Ps.[1] conceive of energies and forces as necessary features of any scheme of explanation of changes or processes. Says Koffka: "we shall stick to the axiom: no change of movement without a force."[2] He seeks to "introduce the field concept into psychology, meaning by it a system of stresses and strains which will determine real behavior." He speaks of "lines of force" of "the forces which regulate our behavior," and of "tensions" which are responsible for behavior.

Köhler and Lewin are hardly less explicit in their use of these and similar expressions. Indeed, all the leading G. Ps. make much of the dynamic character of their theories.

I propose to inquire as briefly as possible in what ways and how far the G. Ps. have advanced our understanding of the dynamics of mental activity and behaviour. I shall consider mainly the views of Köhler, Koffka, and Lewin.

Before plunging further into the inquiry, let me try to express my general attitude towards G. P. by stating concisely the principal features of it with which I find myself in agreement.

I wholly approve (1) G. P's. repudiation of atomism, sensationism, connectionism, behaviorism, associationism and, in general,

[1] I beg pardon for the use of the abbreviations G. P. and G. Ps. in place of Gestalt psychology and Gestalt psychologists, respectively.
[2] Kurt Koffka, *Principles of Gestalt Psychology* (New York, 1935), p. 43.

the excessive appeal to habit as an explanatory principle;[3] (2) its insistence upon all pervading activity; (3) its insistence upon the necessity of recognizing natural wholes or units of activity, in each of which every part is in some sense a function of the whole; (4) its insistence upon the necessity of distinguishing in psychology between, on the one hand, structure and, on the other hand, functioning or activity; (5) its recognition of the fact that we commonly respond, not to stimuli merely, but to perceived objects; (6) its fresh open-minded approach to many hoary problems; its quickness to recognize various problems as such, and to tackle them boldly in place of contenting itself with the invocation of traditional shibboleths, as, for example, the settlement of all problems of space-perception by utterance of the blessed word, kinaesthesis; (7) its free and bold use of hypothesis; (8) lastly and especially, its search for adequate dynamic principles. I add that I much admire the ingenuity and fertility in experiment of the G. Ps., especially in the field of visual perception.[4]

But my hearty approval and agreement under these heads is a little chilled by the way in which the G. Ps. seem to claim all these virtues as their exclusive property and incline to regard themselves as the original discoverers and propounders of all psychological truth. It would hardly be a caricature of this weakness to say that they display a deplorable ignorance, or a still more deplorable ignoring, of the work and views of others, especially of predecessors, along all these lines; that they imply that no truth is a truth, and no proposition has been propounded, until it has been propounded by a member of the Gestalt school in good standing. To which may be added a third implication: namely, no truth is a truth until it has been demonstrated by laboratory experiment. Köhler's admirable exposition of Gestalt principles[5] begins with a long and effective polemic against the twin complementary American absurdities, Watsonian behaviorism and Titchenerism, which latter he speaks of, not quite fairly, as introspectionism. He goes on to argue

[3] Köhler writes: "Habit has been enormously overrated in the theoretical treatment of life" (*Gestalt Psychology*, New York, 1929, p. 138). The page references later given in the body of the text refer to this book.

[4] I say the field of visual perception; for Köhler's observations on chimpanzee-behaviour were not in any way the outcome of Gestalt principles, but rather were such as any man of enterprise and high intelligence might have made, if he had been shut up for four or five years with a cageful of great apes. In spite of this accidental relation, these observations, so excellently made and interpreted, have been a godsend to G. P., adding vastly to its prestige and popularity.

[5] *Op. cit.*

effectively against what he calls "the machine theory" of human activity, by which he means all theories (such as old-fashioned associationism, the connectionism of Thorndike, the habit-theory of Dewey and Woodworth, the reflex and conditioned reflex theory of Pavlov) which would explain the order and succession of mental states and bodily actions in terms (only or chiefly) of pre-formed nervous structure (especially when conceived as paths of low synaptic resistance binding neurones into functional groups) constraining the course of each neural excitation to one prescribed path.

All this triumphant polemic is so conducted by Köhler as to leave the moderately informed reader with the impression that he, if not content with the demolished theories, has no alternative but to jump on the Gestalt band-wagon forthwith.

In short, the G. Ps. form an excessively loyal group of propagandists, a sect, each member of which plays the game of the group. Instead of adopting the scientific attitude of attempting to add to and improve such poor beginnings of a science of behavior as have already been achieved, each member of the group seeks rather, in the manner traditional among metaphysicians, to institute a system wholly new and peculiar to the group or school.

In protest against this procedure I would submit that no one of the principles of G. P. is new, except one which is, I think, demonstrably false; namely, the principle of *isomorphism.*

A whole article or volume might be devoted to demonstration of this truth. In this note I will only point out that in respect of the main features—the rejection of atomism and the introduction of dynamic or explanatory principles other than connectionism, the reform has been very general, proceeding from many schools and individuals.

Even Wundt, Ebbinghaus, Müller and many others of that ilk did vaguely and very inadequately under the head, attention, apperception, selection, or what not, recognize some activity complicating pure connectionism. And to the recognition of the facts of conation many streams have contributed—all the act-psychologists, as well as the experimentalists of the Würzburg group; with their timid recognition of determining tendencies, *Aufgabe, Einstellung,* motor sets, etc.; Binet, Claparède, Stern; the American functional psychologists; all these have been gradually recognizing the importance of conation, to say nothing of British psychologists in general and the psychoanalysts of all schools. Even the behaviorists, with their "drives," and the American social psychologists and sociologists, with their vague all-comprehensive "attitudes," have not been left quite untouched by the general movement.

But one man above and before all others has made adequate recog-

nition of conation, of the fact that it completely dominates association and reproduction, and pervades and controls all perception, all memory-functions, all judgment and reasoning, as well as all bodily action; of the fact that all mental life and activity occurs in wholes, in natural conative units, temporal, spatial and logical, as well as volitional; units or wholes of which conative energy is, in every case, the binding, organizing power. I refer, of course, to G. F. Stout who, though much influenced by Herbart, Brentano, and James Ward, made a great and original contribution to this topic. He developed also an account of the structure of the mind as a system of systems, growing and multiplying by differentiation, an account which goes far beyond any account of mental structure and its growth which the G. P. has given us hitherto.

My own efforts during more than a third of a century have been devoted mainly to the endeavour to extend and fill out Stout's scheme of mental structure and activity: (1) by supplementing it from the physiological side by insisting on the principle of the flow and shifting of energies from part to part of the nervous system, and by attempts to throw light on the factors and principles which govern the distribution and direction and interplay of conative energies (in my many articles on inhibition and on visual phenomena, such as after images and contrast, especially in my two articles on graded contrast and in those entitled respectively "Physiological Factors of the Attention Process,"[6] and "Sources and Direction of Psycho-physical Energy;"[7] (2) by building up (again, closely following Stout) a theory of the sources of such energies in conative dispositions, and of the organization of the latter in a vastly complex hierarchy of sentiments. To which I may add that in my *Body and Mind* (1911) I insisted, at considerable length and with varied illustrations, upon the Gestalt principle *par excellence,* namely, that, in perception, the whole determines its parts, makes them what they are.

Turning now from this unpleasant question of priorities and originalities to the dynamic principles of G. P., I find the views of Köhler and Koffka so nearly alike that in part they may be discussed together, while those of Lewin are so widely different as to require separate consideration.

Both Köhler and Koffka recognize energies and energy problems of two kinds: first, the field-energies—forces operative in the patterning of perceptual fields; these they call the *field energies* and forces (or tensions, strains, stresses, etc.).

Secondly, energies and forces which Koffka describes as of two sub-kinds (*intra-ego-forces* and *ego-environment forces*), and which Köhler is content to speak of, quitely vaguely, as "directed

[6] *Mind*, 1902, XI, 316-351; 1903, XII, 289-302, 473-488.
[7] *American Journal of Psychiatry*, 1913.

attitudes" which involve "definite physiological stress exerted upon a sensory field by processes originating in other parts of the nervous system" (p. 184). For both of them the forces of these two (or three) kinds coöperate to determine "the total field." The principal difference between their treatments is that, while Koffka considers primarily these forces as operating in the psychic sphere, Köhler directly concerns himself with the neural energies and forces. Says Köhler: "The play of all these stresses, their origins, the strain exerted by them upon different parts of the total field, the changes which may be the consequence of that strain, and the cessation of stresses and strains which follows certain of those changes—this is the major study of psychology, as it is the major content of our life" (p. 327).

This difference of treatment is a minor one: both Köhler and Koffka assume the principle of *isomorphism,* according to which the psychic field at any moment is a true (if incomplete) picture of the total field of neural process, reflecting truly its parts and relations, spatial, temporal, and dynamic.

Köhler's main interest and effort is to establish his view that the *segregated wholes* (*Gestalten*) of perception are formed in large measure by dynamical self-distribution of energies, independently of all preformed structure (whether acquired through prior experience and activity or inherited). Thus he contends that, in visual perception, spatial patterning, the segregation of distinguishable parts of the field, must be largely independent of meaning (which means the influence of pre-existing structure, or organized traces of past activities). He does not deny all influence of such traces (or pre-existing organized structure) which manifestly is essential to all recognition and all memory function; although, in his polemic against excessive reliance on "meaning," he at times may seem to attempt to deny it all influence. I think it must be admitted that here Köhler makes good his case. For, in all visual perception, some spatial patterning must be given in order that "meaning" shall be evoked; and such patterning, such formation of segregated wholes, follows pretty closely the patterning of the objective field in most cases (or it would be of little use to us) though subject to various modifications by dynamical self-distribution (as most clearly in all cases of visual contrast).

But, when we have accepted Köhler's principle of dynamical self-distribution as yielding "segregated wholes" of a primary kind, it

remains: (1) that Köhler has succeeded in throwing very little light upon how this primary patterning of the visual field is effected (beyond the old assumption of projection of the retina on the cortex by insulated fibers of the optic nerves and tract); (2) that, given a patterned field of activity in the cortex corresponding to the objective field of view, he leaves utterly unexplained the correspondence with it of the patterned sensory or psychic field: he asserts merely the principle of *isomorphism*. This is a special form of the principle of psycho-physical parallelism. Like that principle, it asserts some constancy of relations between the brain-processes and the psychic processes of each organism; but it carries this principle further, assuming special and detailed corespondence; especially in respect of spatial extension and relations it assumes that, whenever you are aware of spatial relations and patterning, there is corresponding spatial patterning of the field of cerebral excitation. Now Köhler is very reserved in regard to the problem of psycho-physical relations; he does not assert that the assumed spatial patterning of the cerebral field of excitation causes, or is the ground of, the awareness of the spatial pattern; but this, though not asserted, is implied in all his discussion. But whether the causal dependence of the spatial awareness upon the spatial patterning of the cerebral process is, or is not, implied, this alleged isomorphism of the psychic and the cerebral fields in respect of spatial relations is left a blank mystery; is in no sense explained or rendered intelligible.

I had thought that, in this matter of spatial perception, Lotze had said the decisive word for all time; namely, that mere extension of the cerebral excitation cannot be the sufficient ground of awareness of extension and spatial relations, that the brain-process must involve some system of peculiarities which serve as the ground of spatial discrimination (his famous local signs).

And if, in spite of total lack of intelligibility, we accept extension of the cerebral excitation as ground of spatial awareness in the case of visual perception, how can we account for the lack of similar spatial awareness in auditory perception? When, amidst a tumult of sounds, I hear and understand the sentence spoken by a friend, or a bar of music, a melody, or merely the call of a bugle, there is a Gestalt, a patterned whole of sound discriminated and segregated from the background. The auditory figure thus *gestalted* must correspond to, and have as its ground, some cerebral excitation which is spread out in space: yet the auditory figure, or Gestalt, may be totally

devoid of spatial quality. Why, on the principle of isomorphism, should the cerebral segregation of a part of the total visual excitation give rise to a spatially segregated figure in the psychic field, while the auditory field of excitation spatially distributed in the brain gives rise to a segregated psychic figure which has no spatial quality? It is no answer to say that some auditory experiences are vaguely localized; and, so far as I can see, Köhler's principles offer no possibility of an answer. Any answer to this question must involve, as Lotze so clearly pointed out, the postulation, among cerebral processes initiated by visual excitation, of some special grounds of spatial localization, grounds of a kind which are lacking in the case of auditory cerebral excitation. But I must recur on a later page to the question of isomorphism.

(3) Given the segregated whole of the cerebral excitation (brought about largely by "dynamic self-determination") we desire to know how this evokes special meaning dependent upon pre-existing organization (such meaning as is involved in all recognition). A group of curved lines on a clean sheet of paper evokes a primary figure upon a background, a segregated whole, a Gestalt; but, at first glance, it means nothing more. Presently, as you examine it, the group of lines, segregated as a primary whole or Gestalt, evokes a more special meaning; the lines, as we say, suddenly become or mean a face. In a multitude of familiar instances of this kind, we have the clearest possible evidence that perception is often an affair of at least two stages (as James and the G. Ps. assert it is not). The G. Ps'. polemic against *empiristic* explanations cannot abolish the fact that somehow our past moulds in decisive fashion almost all our present. Köhler's only answer to this problem is to say: "It is precisely the original organization and segregation of circumscribed wholes which make it possible for the sensory world to appear so utterly imbued with meaning to the adult, because, in its gradual entrance into the sensory field, meaning follows the lines drawn by natural organization. It usually enters into segregated wholes." (p. 152).

(4) But, most weighty problem of all, the segregated whole having been formed, and meaning having entered into it, how does the process go on to "involve a definite physiological stress exerted upon a sensory field by processes originating in other parts of the nervous system?" Or, in Koffka's terminology, how does the Gestalt in the *behavioral field* arouse the *ego-environmental forces* and the

intra-ego-forces, and bring them to bear upon the total field? For this further process and the further action of these forces provide the all-important problems of human psychology. These are the processes and forces which lead on to action. The processes of perception are of importance only as leading to action.

Go back to the case of the group of lines on paper which evoke, as a second stage of perception, the meaning of a human face. Suppose a third stage: After a few seconds of contemplation of the group of lines, now seen as a face, you suddenly become aware that it is a cruel caricature of your own face. *Ego-forces* are at once aroused, forces compared with which the forces of the behavioural or sensory field (the forces of dynamical self-distribution) are quite insignificant; forces which may bring about considerable redistribution of energies in all parts of your organism.

Or again, you recognize in the segregated whole of lines the face of your beloved; and, in the light of prior knowledge, you know that it means that she is in danger and distress and is calling for your help. At once ego-environmental forces of the most violent kind are evoked and brought into the total field; forces "originating in other parts of the nervous system": instantaneously you enter upon a course of furious, long-sustained and, perhaps, infinitely varied activity, all of it directed to the attainment of one goal.

It is activity of this last kind which exhibits, subjectively and objectively, most clearly and in highest degree, the peculiarities of conation. It is a delicate question whether and in what manner conation enters into that primary patterning of the sensory field which the G. P. is so much concerned to exhibit as the consequence of dynamical self-distribution. Perhaps such processes are wholly physico-chemical, as Köhler assumes; perhaps here the principles of Gestalt dynamics are adequate: *the tendency to return to equilibrium,* the laws of *closure* and *Prägnanz,* and those other quasi-ethical laws, laws of *good shape,* of *fittingness,* of *good continuation,* etc., according to which all virtuous *Gestalten* habitually regulate their behavior. But it is the activities of the other kind, the truly conative, the unmistakably purposive, which psychology must learn to understand, if it is to be of any service to mankind. It is just because the psychoanalysts of all schools recognize and are wholly concerned with these truly conative forces and with the origins and organizations of them, that, in spite of many extravagances and absurdities, they have achieved so much practical and popular success.

And what have Köhler and Koffka to say on this great dynamic problem? They have nothing to contribute. Both make a certain grudging inadequate recognition of these conative, these purposive, activities. Both use the words "purpose" and "conation" very rarely and incidentally. Yet both have the virtue of recognizing that such processes completely dominate mere reproduction-tendencies (as Stout and I were insisting before G. P. was heard of); and Köhler has the further merit of recognizing the reality, the wide prevalence and the important rôle of specifically conative experience. Most of what he has to say of *insight* implies such immediate conative experience. Yet the most important rôle of conation in our intellectual life eludes him entirely, namely, its rôle in determining judgment and in effecting relevant selection in reasoning; further, its part in establishing beliefs of every kind, and especially (as I have insisted in my *Outline of Psychology*) in establishing belief in the reality of one's self, a belief from which all other belief in reality of every kind derives.[8]

As to the sources of these tremendous energies, Köhler has nothing to say beyond some vague utterance of the blessed word "needs," the statement that they originate in other parts of the nervous system than the sensory cortex, and the recognition of the all-dominating power of the stress of *directed attitudes.*

We are left vaguely to suppose that these forces also are all to be understood as instances of return to equilibrium after disturbance of some kind. This may be true in a very wide loose sense. For it may be true that the law of entropy holds good for all vital processes, including our conative activities. In a similar sense a hurricane, a volcanic explosion, or an earthquake may be explained as instances of return to equilibrium. But the phrase does little to explain these phenomena; and it certainly brings no more enlightenment when invoked as the dynamic explanation of an outburst of fury or of sexual passion, of the migratory flight of a bird, or of the sustained ever-renewed and intense efforts prompted by such sentiments as a strong ambition, an intense patriotism, or a maternal devotion.

Köhler, in fact, with all his efforts to illuminate dynamical self-distribution, achieves little more than to recognize and to point out some of the facts as problems awaiting solution. The paucity, the vagueness, and the inadequacy of his dynamic principles are illus-

[8] Cf. in this connection a monograph on *The Psychology of Belief* by Helge Lundholm, shortly to be published.

trated most vividly by his neglect to take account of, or to attempt to throw any light upon, the two most striking and universal manifestations of dynamical self-distribution, namely, concentration of energy and the reciprocal inhibitions of forces or energies at work. These are two complementary manifestations of dynamical self-distribution with which I, for one, have struggled continuously since the year 1900. About that date I devised my well-known "dotting method" and other procedures for the study of those phenomena and formulated the hypothesis of inhibition by drainage for the explanation of them. Inhibition must certainly play an immense rôle in dynamical self-distribution, both in the sensory field and in the truly conative activities; yet Köhler hardly refers to it in his principal work and, I believe, has made no attempt to throw light upon it.[9]

I am not contending that Köhler's views are altogether or mainly mistaken. With the exception of two very questionable assumptions which are fundamental in his scheme, that of isomorphism and the assumption that the principles of physical chemistry will suffice to explain all human activity, he is, in my opinion, almost always right, certainly more nearly right by far than those whose views he criticizes. And in his *Gestalt Psychology* there are a few passages which show that he is more nearly on the true path than he himself has perhaps realized. I refer to a few scattered passages in which he makes brief reference to fear, to anger and to other emotional responses. Referring (p. 355) to his experience of an earthquake, he writes: "There was no doubt whatever about my being frightened by that sudden rattling and shaking. Once more the attitude—if fright may be called an attitude [I agree, it is a poor designation]—*was felt as obviously and naturally produced by that new experience* . . . Fright is *experienced as* jumping at us right out of the very nature of certain definite events." Again, (p. 381) he writes: "When a sudden event is felt as producing fright in me, I shall have to add at once, in a correct description, that with the fright there arose a vehement impulse to move away from the locus of that event. Again, this tendency immediately to increase the distance between that place and myself is experienced as being the direct outcome of the startling occurrence quite as much as the fright itself is felt as its direct result. . . . Does anyone believe that the [frightened] child feels a fear of the object, on the one hand, and

[9] The remark applies also, I believe, to the other G. Ps., although some of them seem to make covert use of the hypothesis of drainage.

an impulse to move away, on the other, as independent experiences? . . . As an impulse of withdrawal arises directly out of certain given situations, so the opposite tendency belongs as naturally to other situations."

On the last page of the same book is a brief mention of anger in an ape. After describing how an ape, striving to thrust a branch between the bars of his cage *in order to reach a banana,* is thwarted by a projecting lateral branch, Köhler writes: "Suddenly, however, and just after pressing forward with all his force, he pulls the stick back in the cage and bites the branch with the ferocity of anger. . . . When an obstacle is experienced in our way we become angry by immediate determination, and our anger [N.B. the anger of both ape and man] is an attitude directed toward or against the obstacle. Consequently after the main object, the banana, has determined the primary direction, the felt obstacle will make the ape's direction bend towards the branch, and since the tendency directly determined by anger is attack or destruction, the ape will begin to destroy the obstacle." Again (p. 355), referring to his own anger on finding in disorder the apparatus he had carefully adjusted for his work, he writes: "I was angry *about the alteration.* Again the attitude is felt as *founded upon* something definite, its character being the natural and direct consequence of that something's properties."

On yet another page (352) he writes of admiration as "a directed attitude," an attitude directed towards the admired object. And (on page 383) he describes how, at a bull-fight, "the admiration of the crowd often drives them so intensely in their hero's direction, that, unable to enter the arena themselves, they hang over the balustrades, reaching toward him as far as possible; the stress will sometimes be so great that hats, handkerchiefs, and so on, are thrown down in the direction of the dominating impulse. Did these people learn gradually by some process of conditioning to connect an approach-tendency with admiration, as though a tendency towards frowning or shaking the left leg might have been, if conditioned, equally well 'connected' with admiration?"

These few remarks on emotional attitudes scattered about Köhler's pages are highly significant. I would draw attention especially to his use of the word "natural" as applied to describe both the emotional-conative response to certain situations and the intimate relations between the directed impulse and the emotional quality of

each such whole activity, an intimacy so close that the two facts abstractly distinguished by language as impulse and emotion can only be properly regarded as two inseparable aspects of one natural activity.[10]

Köhler in these few remarks on emotional attitudes virtually implies and accepts the essence of my much criticized view of the relation of emotion to impulse, to conative activity, to action of every kind. And not only that; he also virtually implies and accepts the hormic theory of activity. For his remarks not only insist on the naturalness and immediacy of the emotional response with its felt impulse and emotional quality (without any of the haggling over seeming exceptions which constitutes the substance of the multitude of argumentations against my view), they recognize also the all-dominant rôle of such attitudes, such conative responses, and imply no less clearly the innate hereditary nature of the capacities for such responses: that is to say, Köhler's remarks imply the reality of native emotional-conative dispositions from which these emotionally toned impulses are immediately evoked on perception of objects and situations of certain kinds.

The mere fact that Köhler unhesitatingly describes the ape's attack on the obstructing knob as made with the ferocity of anger; that he recognizes the ape's anger-impulse as essentially of the same nature as the anger-impulse of man (generalizing to the effect that, for both ape and man, "the tendency directly determined by anger is attack or destruction" directed towards the exciting object); this fact implies unambiguously the recognition of the anger disposition as an ancient feature of man's constitution, unchanged in its essential nature during the million years or more of man's ascent from the animal level. Let no one protest that here Köhler is carelessly lapsing into the language of commonsense. There is a touch of such lapsing when he writes, "the tendency directly determined by anger": for the felt tendency, as I have so often insisted, is of the very essence of the anger-response, rather than determined by it. But Köhler is no more afraid than myself of agreeing with the sound commonsense which embodies the practical experience of countless generations of men, especially when that "common-sense

[10] Koffka, as we shall see, repudiates this view in common with the vast majority of our colleagues. Truly this simple truth would seem to be one of those which are hidden from the great and wise men and revealed only to babes and sucklings, such as Köhler and myself.

view" is supported by all that is best founded in the teaching of evolutionary biology.

In short, it seems clear that Köhler, if he were primarily a biologist, rather than a physicist, could hardly fail to go on to full and explicit acceptance of the hormic principle.

He might discover, also, that those "other parts of the nervous system" in which the over-riding impelling forces of his multifarious "attitudes" originate are identical with the thalamic centers of emotional expression to which I (following a multitude of indications, anatomical, clinical, vivisectional, and evolutionary) confidently pointed in my *Social Psychology* (1908) and some of which have been experimentally established in recent years by the work of Cannon, Bard, and other physiologists.

(To be continued)

CONNECTIONISM; WANTS, INTERESTS, AND ATTITUDES

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In the third of his three books[1] presenting the recent experiments of himself and his co-workers upon the nature of learning Professor Thorndike considers wants, interests, and attitudes. The experiments and the results are devised and interpreted from his connectionistic point of view. For, in spite of the very important major and exciting alterations which he has introduced into his theory of learning, since it was first stated in the *Animal Intelligence*[2] and reiterated in the *Educational Psychology*,[3] Thorndike is still very much of a connectionist.

The present book is divided into two parts. Part I is entitled the "Influence of Wants, Interests, and Attitudes," and it appears that learning is still to be conceived (in spite of some changes in the formulation) as essentially a mere matter of the stamping in of atomistically conceived S-R connections, where wants, interests, and attitudes serve to determine the rewards which do the stamping in.

In a typical experiment in Part I, a list of forty words is read to the subject one at a time at a rapid rate for many successive trials. And after hearing each word the subject has to respond to it with one of the digits from 1 to 6. For each word one of these digits is correct and the other five wrong. When the subject responds with a correct digit, he is "rewarded" by hearing the word "right." But when he responds with an incorrect digit, he is "punished" by the word "wrong." The effect of these "rewards" and "punishments" is strengthened by a money bonus dependent upon the total number of "rights"—that is, upon the speed of learning.

[1] E. L. Thorndike, *The Psychology of Wants, Interests, and Attitudes* (New York, 1935). The other two were *Human Learning* (New York, 1931) and *The Fundamentals of Learning* (New York, 1932).

[2] New York, 1911.

[3] Three vols. New York, 1913.

From such experiments, analyzing primarily the results for the first four trials, Thorndike finds:

(A) that the frequency with which a given connection (the giving of a given digit in response to a given stimulus word)—after it has occurred and been "rewarded" in one trial—occurs in the next trial is almost three times the effect of chance;

(B) that the frequency with which a given connection—after it has occurred and been "punished" in one trial—occurs again in the next trial is a little more than chance;

(C) that punished connections, which in a given trial have occurred just preceding or just succeeding a rewarded connection, tend to be repeated in the next trial with greater frequency than do punished connections which occurred at a greater distance from a rewarded connection. In other words, the influence of a reward seemed to spread, in some degree, to connections which were merely in close temporal proximity to the connection to which the reward really "belonged."

Based upon the above findings and upon those reported in the two previous books, Thorndike's present theory of learning is to be summarized as follows:

(1) The original Law of Exercise is no longe to be held to. The mere repetition of a response, if the latter have no greater satisfying after-effect than do the other alternative responses, does not tend to stamp this one response in. (The experiments indicating this were reported primarily in the two previous books.)

(2) The original Law of Effect is to be modified in that it now appears that whereas a satisfying after-effect does strengthen the connection which it follows, an annoying after-effect has no weakening effect (see B above).

(3) The influence of the satisfying after-effect tends to spread to relatively adjacent connections (see C above).

(4) A connection between a stimulus and a response is strengthened by repetition followed by satisfyingness only in so far as this situation and response are respectively presented and induced in such ways as to make them "belong" together (a finding reported primarily in the two previous books) and in so far also as the satisfying after-effect is proximate to and tends logically and psychologically to "belong" to this connection (a finding indicated by some of the other experiments reported in the present book).

So much for the main features of the theory. It appears, how-

ever, that there are also certain auxiliary principles to be considered. These are: *relevance, confirming reaction, informative or validating influence,* and *overhead control.*

Under the head of *relevance,* it appears that a reward or satisfying after-effect tends to strengthen the connection preceding it the more this after-effect is relevant to the purposes leading to this connection. Thus, in a complicated experiment reported, in part, in the present book, the effects of the responses were varied so that some were satisfying to the purpose of learning, others to an irrelevant desire for money, and others to general interests not connected with the experiment in question. And the results favored the conclusion "that a satisfying after-effect strengthens somewhat the connections to which it is attached, even though it is irrelevant to the purpose in the interest of which the connection was made and highly incongruous with the cravings and expectations of the person at the time" (p. 60). But these irrelevant after-effects do not strengthen as much as do relevant ones.

Confirming Reactions. Thorndike assumes that a reward or satisfying after-effect can produce a strengthening of the connection to which it belongs in either of two ways. And the first of these is by what he calls the confirming reaction. A satisfying after-effect, he says, can "act directly upon the neural fact (whatever it is) which corresponds to the connection (that is, the probability that S will evoke R,) producing some change in it which heightens that probability" (p. 28). This direct strengthening he assumes to occur directly, without the intervention of any consciousness. And he calls it a ***confirming reaction.***

It appears also, however, that a satisfying after-effect can also work indirectly through a *validating or informative process.* When this latter operates, he says: "the increased probability that S will evoke R comes about as follows: When the word [the S] recurs in the next trial of the series, and the subject considers what number he shall say for that word, the thought of the number [the R] which was rewarded will be more likely to make him think of 'Right' and less likely to make him think of 'Wrong' than the thought of one of the other numbers; and the thought of 'Right' along with the thought of the number for that word will more or less validate that choice and incline him toward it" (pp. 28 f). In other words, in this case of a "validating or informative influence," he assumes that there is time for the stimuli to call up ideas (thoughts) of the

alternative possible responses and of the "rights" and "wrongs" which, on previous trials, respectively followed them. He believes, however, that "the direct confirming influence exerted by a satisfying after-effect is responsible for all save a small fraction of the strengthening by rewards in the experimental results—reported in this book." He says: "We have tried [by the speed with which the successive stimuli to which response had to be made were presented and by analyzing the data for only the first few trials] to keep the informative influence at or near zero" (p. 29).

Finally, as to an *overhead control,* Thorndike says: "The confirming reaction seems often to issue from some overhead control in the brain, the neural basis of some want or 'drive' or purpose or the active self of the animal" (p. 41). And it appears that "the potency of a confirming reaction may bear little relation to the intensity of the satisfier. A 'want' or 'purpose' or 'self' may be as well satisfied, and so issue as full and adequate a confirming reaction, by a moderate reward as by one much larger" (p. 42).

So much for a general outline of the facts and theory presented in Part I. The writer finds three difficulties with them.

(1) The theory is still too "connectionistic." Although it now seems to allow for a governing influence of "wants, interests, and attitudes" upon learning and even allows for an "overhead control," it still makes no place for any influence of such "wants, interests, and attitudes" upon the later functioning of what has been learned. Indeed, for anything Thorndike says to the contrary, it would appear that once an S-R connection has been formed, this S-R connection will continue to function on all subsequent occasions, even though on these later occasions the R no longer leads to a satisfying after-effect. But this we know to be contrary to the finding of animal experiments on the effect of the introduction and removal of reward after learning.[4] From these experiments it appears that, independent of any possible new unlearning or relearning, the responses to given S's will vary with the goodness of the to-be-expected after-effects. S-R connections do not seem to be simply isolated affairs

[4] See, for example, E. C. Tolman and C. H. Honzik, "Introduction and Removal of Reward, and Maze Performance in Rats," *University of California Publications in Psychology,* 1930, IV, 257-275; or M. H. Elliott, "The Effect of Appropriateness of Reward and of Complex Incentives on Maze Performance," *University of California Publications in Psychology,* 1929, IV, 91-98, and R. H. Bruce, "A Further Study of the Effect of the Variation of Reward and Drive upon the Maze Performance of Rats," *Journal of Comparative Psychology,* 1935, XX, 157-182.

which go off willy-nilly until new, equally rigid ones have been formed. Indeed, taking all the evidence into account, it appears to the writer that learning must be conceived, not as the establishment of simple S-R connections, but rather as the establishment of S-r-s wholes, wherein r and s may be defined as "expectations" that, if S is responded to in the manner r, the effect, s, will result. And then the actual performance, R, on a given occasion will depend upon whether or not this expected after-effect, s, will be satisfying or not (given the controlling wants, interests, attitudes at the moment). In other words, I believe that the actual mechanisms of learning and performance are always of the type which Thorndike reserves only for the case of the working of "informative and validating influences." I believe, in short, that there is here no essential difference in this respect, neurologically or in any other way, between cases involving consciousness and ones not involving consciousness.

(2) I am also doubtful of Thorndike's apparent finding that negative, annoying after-effects do not weaken the propensity to the given R under the conditions of Thorndike's own experiments. For, from some repetitions which are now being made of experiments similar to Thorndike's (the experiments are being carried out by Miss C. A. Prowse), it appears that perhaps the reason why the initial punished responses in the Thorndike experiments were apparently not weakened by their bad after-effects and continued to occur in the next few trials with more than chance frequency is really because these responses (even on the first trial) were not determined by chance. That is, from our present experiments we seem to be obtaining evidence[5] that the initial tendencies to give certain numbers in response to certain words on the first trials is not the product of chance but of actual positive propensities for certain numbers in connection with certain words, and the fact that the punished responses still occur as frequently as chance on the next two or three trials may mean merely that these initial strong tendencies have not yet been weakened below what chance alone would give. It does not mean that they have not, none the less, been reduced below their initial strengths.

(3) Finally, I am doubtful of the interpretation given by Thorndike to his finding that punished responses which just precede and

[5] The possibility of this was first suggested to the reviewer by Buel. See E. L. Ballachey and J. Buel, "Food Orientation as a Factor Determining the Distribution of Errors in the Maze Running of the Rat," *Journal of Genetic Psychology*, 1934, XLV, 358-370.

just succeed a given correct response are reinforced because of a mere spread of the good after-effect to connections which are temporally adjacent to it. For it also appears from the experiments just mentioned, now in progress under Miss Prowse's direction, that the subject does not really respond with successive isolated digits, even where the whole list is run through rapidly, but he responds rather with larger or smaller patterned groups of successive digits. And when one of these digits proves correct, the whole pattern, including those which have just preceded and those which have just succeeded, tends to be somewhat reinforced.

To sum up, then, my criticisms are three: (1) I believe that learning, even when it goes on very rapidly and without the benefit of consciousness, is the building up of an (S-r-s)-R complex and not of a simple S-R complex; that is, I believe that there is probably no fundamental or essential neurological difference between learning in situations in which consciousness does not have time to enter and situations in which it does. (2) I believe that, if the effect of initial biases in favor of certain digits for certain words be discounted, then it will turn out that negative after-effects weaken the propensity to responses just as directly as positive after-effects strength them. And (3) I believe that the finding of the spread of the good after-effect (or of a bad after-effect) is a function of the fact that not the individual items but groups of items tend to constitute the units of learning.

Let us consider now, briefly, Part II, which is entitled "Changes in Wants, Interests, and Attitudes." Thorndike here considers these motivational factors as themselves but responses of a general order. And his question thus becomes, What are the laws by which these general R's become attached to, or detached from, stimulus situations? He presents five types of experiment.

In the first type of experiment, Christmas cards, lines of verse and of prose, single words, pictures, patterns of colored paper, etc., are presented over and over again. The subjects rate them in terms of degrees of liking or disliking. The attempt is then made to see if items which were initially neutral tend to take on the pleasantness or unpleasantness of surrounding items. Do the pleasant or unpleasant responses made to the adjacent items tend eventually to be carried over to the adjacent but originally neutral items. The outcome was negative. He concludes: "Mere contiguity to liked (or disliked) situations does little or nothing—In the experiments when

nothing was done save to present 'neutrals' with 'goods' or with 'bads,' nothing happened as a result of the association" (pp. 169 f).

In the second type of experiment the procedure was similar to the above, save that suggestions were added to the effect that the neutrals presented with the goods were to be esteemed and liked, and that those presented with the bads were to be disesteemed and disliked. The results were somewhat more positive. The neutrals did to some degree take on liking or disliking, respectively.

In the third type of experiment the subject's feeling or attitude was made to lead to a satisfying after-effect by its being intimated to him that his feeling or attitude with respect to a given item was shared by others. Thus, for some items expressions of liking were "rewarded" by saying "Yes! I like that too," or "Yes! that is a very fine bit," or "Yes! An exquisite design," and the like. And for other items expressions of dislike were "rewarded" by saying "Only stupid people like that," or "A pompous word," or "A silly jingle," and the like. The outcome was that there was a general shift in the direction of stronger liking or disliking in those cases where such original likings or dislikings were thus "rewarded" by the subject's receiving an intimation that his initial judgments were in agreement with those of more competent observers.

In the fourth type of experiment Thorndike investigated the possibility of connecting new general response-attitudes to stimuli by what he calls "associative shifting." To quote: "When it is impossible or very difficult to contrive that S_1 shall evoke R_x directly, we have recourse to learning by associative shifting, wherein we find some situation (call it S_2) that does evoke R_x and change $S_2 \rightarrow R_x$ over to $S_1 \rightarrow R_x$ (by additions until we have $S_2 + S_1 \rightarrow R_x$, and later substractions until we have $S_1 \rightarrow R_x$)" (p. 191). The main experiment carried out under this formulation was a repetition under more carefully controlled conditions and with more babies of the well-known Watson and Rayner experiment.[6] The actual experiment was performed by Dr. Bregman.[7] Fifteen babies were tested, and six initially neutral stimulus objects were used. Three of these stimulus-objects were presented simultaneously with an electric bell behind the child's back, which by itself called out a startled or

[6] J. B. Watson and R. Rayner, "Conditioned Emotional Reactions," *Journal of Experimental Psychology*, 1920, III, 1-14.

[7] E. O. Bregman, "An Attempt to Modify the Emotional Attitude of Infants by the Conditioned-Response Technique," *Journal of Genetic Psychology*, 1934, XLV, 169-198.

fear reaction. And three stimulus objects were presented simultaneously with a rattle or a melody played on a music box. The rattle and melody by themselves called out a contented or interested reaction. The results obtained were slight. Only a very slight and unreliable shift in the response to the original neutral object in the direction of the responses made to the associated stimuli could be demonstrated. Thorndike believes that associated shifting is probably important in some cases but that it is not as simple and common as has been assumed.

In the last type of experiment the attempt was made to see if stimulus situations which are originally responded to with negative attitudes tend to lose this negative response by virtue of mere frequency of presentation. For that many initially unpleasant things become indifferent with experience seems to be one of the dictates of common experience. In the most striking experiment of this group, the subjects were required to handle a snake, take a dose of cod-liver oil, complete couplets before an audience in fifteen seconds, and to stand on one toe before an audience—each twice a day. This was continued for fifteen sessions. In general, it appeared very decisively that the three tasks, which were rated very definitely as unpleasant at the beginning of the experiment (viz., the handling of the snake, the taking of cod-liver oil, and the standing on one toe) definitely became less unpleasant and practically neutral at the end of the experiment. Thorndike, however, concludes that this outcome is not to be considered a result of the repetition per se, but rather that it is due to new features about the situation being discovered, so that the final stimuli at the end of the training are really different from those at the beginning.

Finally, summing up the whole series of experiments in Part II, Thorndike remains convinced that the only principles at work are the same here as those which he found to operate in Part I. I quote his final words: "A human being learns to react to the situations of life by such and such wants, interests, and attitudes, as he learns to react to them by such and such percepts, ideas, and movements. In both cases, the task of education is to cause the desired connection to occur and to attach the confirming reaction to it" (p. 217).

My criticism relative to Part II would be that, whereas the experimental results are in themselves extremely interesting and probably significant, they do not necessarily require Thorndike's

interpretation. That is, these results do not require that we conceive wants, interests, and attitudes as themselves simple responses. Wants, interests, and attitudes are no doubt evoked in part by external stimulus-situations, and in so far as we may call them consequences or responses, and we may study, as Thorndike has here attempted to do, the ways in which, as such consequents, they become attached to or detached from such specific stimuli as causes. But by far the more important causes of wants, interests, and attitudes would seem to be internal physiological conditions.

And, further, the main significance of wants, interests, and attitudes would seem to lie, not in the fact that they themselves are or are not behavior, but rather in the fact that they in their turn control—select and reject—behaviors. In short, the writer's quarrel is again with Thorndike's too simple (S-R)ism. Wants, interests, and attitudes are obviously much more general and much more subtle determinants of behavior than he makes them out to be. Indeed, as he himself says, they issue "confirming reactions" and involve "over-head controls," and they "accept" and "reject" the after-effects of responses as "relevant" or "irrelevant." But, if "wants, interests and attitudes" really operate in such complicated fashions, I do not believe that Thorndike's present connectionistic (i.e., simple and atomistic S-R) treatment of them is adequate.

The above criticisms do not, of course, deny the extraordinary suggestiveness and fertility of these as of all of Professor Thorndike's experiments and discussions.

NEWS AND NOTES

U. S. A.

Research in Psychology at Yale University

The Psychology Laboratory of Yale University, founded in 1892 by E. W. Scripture, has become differentiated into three closely integrated sections: the Department of Psychology, the Clinic of Child Development, and the Laboratories of Primate Biology. These three units are centrally housed in the Institute of Human Relations Building, closely adjacent to the departments of Biological Sciences, Social Sciences, and Clinical Medicine. A large number of independent and coöperative researches on problems concerning individual and social behavior are being conducted.

The Department of Psychology. The historical antecedents of present-day psychological concepts are the object of research by Prof. R. P. Angier, Chairman of the Department of Psychology. At present Dr. Angier is engaged in the preparation of a monograph on the historical development of theories of motivation. Under his direction Mrs. J. McQ. Irwin is tracing the changing forms of the analysis-synthesis dichotomy in psychological theory and experimentation, with special attention directed to the Gestalt-Behaviorism controversy.

The investigations of Prof. E. S. Robinson into the underlying theory and philosophy of law from a psychological standpoint are embodied in his new book, *Law and the Lawyers.* A study relating the concepts of 'intent' in law and 'volition' in psychology was recently completed by Dr. S. H. Britt. The work of Dr. Robinson and Dr. A. W. Melton on museum research, which was sponsored by the Carnegie Corporation, appears in a series of recent monographs. Under Dr. Robinson's sponsorship, Mrs. A. C. Youtz is doing research on learning and retention.

The Laboratory of Physiological Psychology is conducting a number of studies utilizing clinical material, in coöperation with the School of Medicine and Department of Psychiatry and Mental Hygiene. Prof. C. C. Miles is conducting research on intelligence and psychiatric testing, using time-limited as well as non-timed material. Under her direction, Dr. Lillian S. Wolfe is investigating reading disability in children. An examination of Yogi breathing patterns and the influence of these exercises on mental concentration has been made by Prof. W. R. Miles and Dr. K. T. Behanan. Dr. W. R. Miles is also doing research upon the problem of relaxation by the insensible weight-loss method with psychiatric patients.

In the frame of this unit Dr. N. E. Miller prepared his dissertation on transfer of training and the spread of trauma effects. Dr. Miller also coöperated with Dr. O. H. Mowrer, Sterling Research fellow, and Dr. T. C. Ruch, of the Department of Physiology, in a study of the electrical potential from the retina of the eye. The influence of vision upon the duration of post-rotational nystagmus is being tested by Dr. Mowrer.

Prof. R. Dodge is engaged in the study of terminal artery circulation, and in the theoretical analysis of drives and their manifestations. He

is active in devising apparatus and experimental techniques and is an advisor on a large number of experimental projects on neural excitation and optic nystagmus. Mr. J. M. Porter is following out experimentally certain of the implications of refractory phase for conditioning, both during acquisition and during extinction.

The Habit Laboratory, under the direction of Prof. C. L. Hull, is continuing a series of coördinated projects in the field of learning (particularly conditioned response type) but with a new emphasis upon the motivational aspects. Dr. Hull, with the coöperation of Prof. G. R. Cowgill, of the Department of Physiological Chemistry, is subjecting to experimental analysis the widely held view that hunger contractions play an important rôle in motivation. A mathematical development of his theories of rote learning is also being prepared by Dr. Hull. Drs. Jacobsen and Spence, of the Laboratories of Primate Biology, are collaborating with Dr. Hull on problems relating to the effects of cortical insult upon maze-running perseveration in rats. The alleged inhibitory characteristics of the delay and trace conditioned reflex are being studied by Mr. E. H. Rodnick. Mr. C. I. Hovland has completed a series of researches upon the irradiation of tones of varying frequency and intensity, and is now engaged in the application of principles derived from conditioning to the theoretical analysis of nonsense syllable learning. Problems in secondary and higher order motivation are being carried forward by Mr. A. J. Mitrano, with feeble-minded individuals as subjects at Vineland, N. J., and by Mr. D. G. Ellson with dogs as subjects. Miss R. Hays is engaged in the study of the rôle of patterning in conditioned response learning under Dr. Hull's supervision. Mr. R. E. P. Youtz is making an experimental analysis of trial and error learning and its derivation from simple principles of conditioning.

Experimentation in vision and audition is being carried forward. Dr. R. T. Ross has studied the relative fusion frequency in the foveal and peripheral retina with standard illumination, and is at present investigating the effect of changes in the light-dark ratio on the foveal fusion frequency at different levels of illumination. The effect of the illumination of the surrounding field upon the foveal acuity is the problem experimented upon by Mr. M. B. Fisher. Under Dr. G. R. Wendt's sponsorship a series of projects on summation of stimuli are being performed. Dr. Wendt is also testing the auditory acuity of monkeys after removal of the auditory projection areas. A comparison of various methods of recording galvanic skin reactions is being made by Mr. W. H. Wulfeck.

Dr. A. B. Crawford, Director of the Department of Personnel Study and of the Bureau of Appointments, is developing techniques for differential prediction of grades in the English-History-Language group as against the Mathematics-Chemistry-Physics group. He is assisted by Mr. J. W. McGarvey, who is also studying the rôle of interpolated rest intervals in the acquisition of motor skill.

The psychological approach to the investigation of adolescent growth and development is being represented by Dr. J. B. Wolfe, under the sponsorship of Dr. W. R. Miles. The coöperative research group, under the chairmanship of Dr. M. C. Winternitz, Professor of Pathology in the School of Medicine, also includes an educator, a biochemist, an anatomist, a physiologist, and a pediatrician.

Laboratories of Primate Biology. Experimental work in the field of

comparative psychobiology is being conducted both in New Haven, where the headquarters are located, and in Orange Park, Florida, where a station is maintained for the breeding and study of anthropoid apes. In the various investigations of the laboratories, infrahuman primates, especially chimpanzees, are being employed as experimental subjects.

Prof. R. M. Yerkes, Director of the Laboratories of Primate Biology, is studying a wide variety of problems concerning social and sexual behavior. His survey of the comparative psychopathology of infrahuman primates (with the collaboration of Dr. A. W. Yerkes) has just appeared in Bentley and Cowdry's *The Problem of Mental Disorder.* Dr. Yerkes, with the coöperation of Dr. S. D. S. Spragg and Mr. H. J. Coolidge, has provided a taxonomic classification of skin and coat characteristics in chimpanzees. Dr. Spragg has recently completed a study devoted to the learning of various types of mazes by chimpanzees.

A series of projects on the visual discrimination of chimpanzees is being carried forward by Prof. H. W. Nissen. With Dr. T. L. McCulloch as collaborator, Dr. Nissen has investigated the relative efficiency of paired comparison and strata stimuli techniques for discrimination. Dr. Nissen has also collaborated with Dr. M. P. Crawford on the study of food-sharing behavior in the chimpanzee by the use of the token technique. Coöperation in problem-solving situations is also being studied by Dr. Crawford. Experimental analysis of spatial variables and motivational factors in the delayed response of chimpanzees is being made by Dr. Nissen and Mr. J. T. Cowles.

Frontal lobe function projects are being continued by Prof. C. F. Jacobsen. Lesions of the frontal lobes are being observed in their effects upon memory, weight discrimination, and delayed reactions. Dr. F. V. Taylor is coöperating with Dr. Jacobsen on researches upon restitution of function and delayed responses of monkeys after cortical injuries. The retention of temporal habits after frontal lobectomy is being subjected to experimentation by Dr. Jacobsen and Mr. J. L. Finan, of the Department of Psychology.

A number of problems on metabolism are being attacked by Dr. J. M. Bruhn. With Dr. J. H. Elder, Dr. Bruhn is conducting research upon body temperature in relation to sexual status in chimpanzee. Dr. Elder is also interested in the physiological processes of the reproductive cycle of female chimpanzees. An experimental investigation of ideational or symbolic behavior in chimpanzee by the use of the method of multiple choice is being conducted by Dr. K. W. Spence. Studies of discrimination learning are also being made by Dr. Spence.

Clinic of Child Development. The research program of the Clinic of Child Development combines psychological and medical approaches to the problems of early mental growth. The primary emphasis of the work is upon normal development, but clinical studies are also being made upon defective and deviate children. One of the fundamental tools for research is the cinema. Films of scientific and educational nature have been prepared and published with sound scoring as part of the *Yale Films of Child Development.* This series includes a seven-reel feature talking film entitled *Life Begins.*

The two volumes of the *Atlas of Infant Behavior,* utilizing cinema records from the Clinic's files, have been published by Dr. Arnold Gesell, Director of the Clinic. The first volume is devoted to a delineation of the normal growth and development and was done in collaboration with Drs. Helen Thompson and Catherine Strunk Amatruda. The

second volume, compiled by Dr. Gesell and Alice V. Keliher, Frances L. Ilg, and Jessie Jervis Carlson, is based upon the naturalistic studies. A normative investigation of the first year of life, covering fourteen age levels, has been brought to completion in a volume by Gesell and Thompson (assisted by Dr. Amatruda) entitled *Infant Behavior: Its Genesis and Growth.*

A number of other researches now in progress by other members of the staff may be mentioned. Body balance in sitting and standing, and the strength of the grasp reflex, are being studied by Dr. H. M. Halverson. Mrs. J. D. Krynine is doing her dissertation on the reaching movements of early infancy. Biometric studies of body behavior and growth in infancy through five years of age are being continued by Dr. H. Thompson. Social behavior, and laughter and smiling, in pre-school children are subjects of research by Dr. R. W. Washburn. Miss C. Swan is doing research on the progressive changes in facial expression of children. Mrs. L. B. Ames is studying prone progression of infants.

The work of Dr. B. M. Castner on reading disabilities and the compensatory nature of certain special abilities is being continued. Behavior aspects of feeding in infancy, from a clinical and developmental standpoint, are being investigated by Dr. Frances L. Ilg. Dr. C. S. Amatruda is engaged in the study of handedness and postural development.

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Yale University.

Scandinavia

The Sixth Congress of Scandinavian Psychiatrists: Contributions of Psychotherapeutic Interest

As announced in a previous issue of *Character and Personality,* this congress took place in Stockholm, from August 22 to 24, 1935.

The main subject of its discussions was "The Somatology of Schizophrenia," but, apart from the lectures bearing merely on the physical and medical aspects of schizophrenia, a few lectures were delivered dealing with the psychological and psychotherapeutic aspects of this mental disorder.

V. Mäkelä (Helsingfors) described—by means of instructive case-histories—the general psychological phenomena of schizophrenia, although concerning the ætiology and pathogenesis of this ailment he professed to be in favor of the somatic point of view. The lay-analyst H. Schielderup (Oslo) gave a detailed account of a case-history in which after psychoanalytic treatment certain alterations of character traits took place in the patient. His rather long lecture might be regarded as illustrative of the method of orthodox psychoanalysis, but was of little interest to the audience of experts.

A contribution of undoubted value was that on unconscious symbolisms in an uneducated patient by G. Nycander (Stockholm). All symbols were "highly Freudian," although the patient had never heard of symbolism on psychoanalysis before. The arguments were supported by such convincing material and with so much brilliance that the audience honored them with warm and spontaneous applause.

The present reviewer lectured on the psychopathogenesis of schizophrenia. The subject matter of his lecture is contained in an article published in this issue.

B. Gadelius (Stockholm) lectured on artistic qualities of schizophrenics and illustrated his discourse by an interesting exhibition of pictures and drawings by the famous Swedish artists Josephson and Hill, who were both afflicted with this mental disease.

OLUF BRÜEL.
Copenhagen.

BOOK REVIEWS

AN AUTOBIOGRAPHICAL STUDY. By Sigmund Freud, M.D.LL.D. Authorised Translation by James Strachey. The International Psycho-Analytical Library, No. 26. The Hogarth Press and The Institute of Psycho-Analysis, 1935. Pp. 137. 6/-.

This is a new translation of Freud's contribution to *Die Medizin der Gegenwart in Selbstdarstellungen*, which appeared in Germany in 1925 and which was subsequently appended to an English version of the American edition of *The Problem of Lay Analysis*. It has, however, been brought up to date by the author by alterations and additions to the text, by a number of fresh footnotes, and by the addition of a short postscript to cover the ten years that have elapsed since its first appearance. It is written in the same straightforward and mellow style that is characteristic of all Freud's later writings and will be welcome to many readers as an interesting supplement to the *History of the Psycho-Analytic Movement*, published some twenty years ago.

Though the present work necessarily deals, among other things, with the events recorded in the *History* these events are treated from a fresh and rather more personal angle, effectually preventing any impression of repetition. There is also a much fuller account of Freud's earlier work than was contained in this latter volume. It will be a surprise to many to learn how extensive were Freud's neurological researches of the pre-psycho-analytic period, and in this connection it is worth recording that the *Psychological Register* records no less than twenty-seven scientific contributions before the appearance of the first joint paper with Breuer in 1893. Matters of special interest with reference to this early period include the account of how Freud narrowly missed being the first to demonstrate the uses of cocaine in ophthalmology and how an experiment of Bernheim's, witnessed during a short visit to Nancy in 1889, subsequently gave the clue for the procedure adopted to recover lost memories without resort to hypnotism.

In view of the great importance that psycho-analysts have come to attribute to the first years of life, it will be regretted that Freud devotes no more than two pages to the eighteen years that preceded his entrance to the University. He tells us, however, that from his schooldays onward his curiosity was directed rather to human concerns than to natural objects, that he was strongly influenced both by the Bible story and by Darwin, and that it was hearing Goethe's essay on Nature read aloud that decided him to became a student of medicine. A really analytic study of himself by the founder of psycho-analysis would have been of fascinating interest, in so far as it threw light upon the processes whereby Freud was able, without assistance from others, to overcome the resistances which, as he has so convincingly shown, tend to conceal the Unconscious from our conscious thoughts. But, apart from the fact that the present work was in its original intentions, as the translator puts it, an "auto-ergography" rather than a simple autobiography, it

would seem fairly clear that neither here nor elsewhere has Freud any intention of lifting the veil farther, so far as his purely personal life is concerned. "This Autobiographical Study," he tells us in the postscript, "shows how psycho-analysis came to be the whole content of my life and rightly assumes that no personal experiences of mine are of any interest in comparison with my relations to that science." And again later, "The Public has no claim to learn any more of my personal affairs, of my struggles, my disappointments, and my successes. I have in any case been more open and frank in some of my writings than people usually are who describe their lives for their contemporaries or for posterity. I have had small thanks for it, and from my experience I cannot recommend anyone to follow my example."

In this same postscript he tells us with regard to the last ten years, that his interests, "after making a long détour through the natural sciences, medicine and psychotherapy," have returned to the more purely human and cultural problems that fascinated him in his youth, though the détour has not been in vain, for it now appears to him that the "events of human history . . . are no more than a reflection of the dynamic conflicts between the ego, the id and the super-ego which psycho-analysis studies in the individual." "Looking back over the patchwork of my life's labours, I can say that I have made many beginnings and thrown out many suggestions. Something will come of them in the future, though I cannot myself tell whether it will be much or little. I can, however, express a hope that I have opened up a pathway for an important advance in our knowledge." It is with this highly characteristic combination of candor, objectivity, and quiet confidence that the most revolutionary thinker in the whole history of psychology closes the account of his career.

J. C. FLUGEL.
London University.

THOUGHT AND LANGUAGE. By Philip Boswood. London: University of London Press, Ltd., 1934. Pp. 300. 6*s*.

The title of Dr. Ballard's book should not mislead the reader into expecting that it will be concerned equally as much with thought as with language. An elucidation is indeed given—partially in Chapter II and more completely in the appendix—of Professor Spearman's neogenetic principles. These are said to form the psychological basis of the book; but actually they are seldom afterward referred to, neither are many other psychological data beyond the fact that thought cannot function well without language.

Dr. Ballard's real concerns are with the arts of finding for thoughts their best expression in language, and of teaching such expression to the young. He stresses the non-fixity of language. It is continually undergoing evolution. He therefore sets himself against all pedantry and criticizes those teachers of grammar and linguistics whose views are derived from Latin tradition instead of realistic concern with the reaction of a listener or reader. It is a book written less for the psychologist as such than for the grammarian. By writers and grammarians anxious to improve the effectiveness of their punctuation and style, it will be found to contain unusual viewpoints and to be at once stimulating and scholarly.

PRYNS HOPKINS.
London University.

PSYCHOLOGY AND RELIGION. By David Forsyth. London: Watts and Co., 1935. Pp. 200.

The President of the Psychiatric Section of the Royal Society of Medicine summarizes, in the present book, the case against theological beliefs and brings it up to date.

As a logical introduction to the subject, we are given thumbnail sketches of the history of religion and history of science. In these sketches, religion and science are depicted as having flourished only in alternation, and at each other's expense, and as having demanded different conditions for survival. Tendencies of theology to persecute science, and of science to undermine theology, caused by fundamental incompatibilities in their ideals, are shown in subsequent chapters on science under Christianity and on Christianity as affected by science.

In this first half of the book are presented most of the difficulties which have alienated educated men from the church. To readers of *Character and Personality*, the most valuable contribution of Dr. Forsyth's book will rest, however, in its second half, which is chiefly psychological.

The author here finds that the paradoxes of religion which were so difficult to reconcile with either logic or the world of objective reality, become comprehensible through our new knowledge of unconscious processes. Dr. Forsyth makes a competent application of psycho-analytic principles to the major theological concepts.

The small compass of the book necessarily precludes adequate examination of all, and especially the more subtle, replies which religiously minded people have made to his arguments, and whereby they hope to save the thin essence, but essence all the same, of hard-pressed faith. Other creeds than Christianity, too, have, for the same reason, received but a cursory examination; however, it has been the main lines of religion, rather than their details on which Dr. Forsyth has wisely concentrated his attack.

The book is well organized, and the argument marches with a steady accumulation of evidence towards its conclusion. The tone is the maturely confident one of a writer so assured of the rightness of his case, that he remains calmly judicial.

PRYNS HOPKINS.
London University.

TESTING CHILDREN'S DEVELOPMENT FROM BIRTH TO SCHOOL AGE. By Charlotte Bühler and Hildegarde Hetzer. London: G. Allen and Unwin, 1935. Pp. 191. With Bibliography and Chart. 12/6.

Dr. Bühler offers a test scale which claims to give *a quantitative assessment of total personality* from birth to the sixth year. Her tests are constructed under six developmental categories which "include all the fundamental dimensions of human behaviour and all thought processes."

The analysis of child development into the six categories, whatever its theoretical validity, is workmanlike, and reflects long and practical experience with young children. Stern, it will be remembered, worked very largely with the classic faculties. Dr. Bühler has sense reception, bodily movement, social behavior, learning, manipulation of materials and mental productivity. The test series under each category follow Gessell in attempting to "create natural situations." This should give, in each case, a characteristic response, or "symptomatic mode of behaviour," which has shown, at least to the satisfaction of the authors, a statistical frequency appropriate to its use in a maturation scale. The work is thus interesting as an attempt to give quantitative precision to the generalized observations of the earlier child

psychologists on the early development of sensory and psychomotor abilities and the emergence of the higher mental processes. The tests appear to be such as to explore adequately these aspects of a small child's personality, especially in the obscurity of the first and second years. But it is in these years that life is most dominated by affective considerations, and it is scarcely to be expected that Dr. Bühler's "totality" claim can be substantiated here. She is, however, loathe to relinquish it and appears to claim that, where affective and conative determinants enter, her tests furnish causal interpretation and indicate therapeutic measures, in addition to detecting retardation. No tests, apart from psychiatrical diagnosis, do this.

There are obvious objections to measurements based upon the occurrence or non-occurrence of natural responses to "natural test situations." "Tests" of this kind are rather observations than tests in the laboratory sense, and very much depends on the skill of the observer—the introduction of the element of competition *with the experimenter* in tests of social behavior is an example. Bühler's scale is in no way suitable for lay use. By comparison, for instance, with the Merrill-Palmer scale, a much more specialized technique is involved, and it is doubtful whether the advantages—if laboriously "created" natural situations are an advantage—over the Merrill-Palmer scale justify this. The clinical psychologist, concerned with assessing a child's mental ability to cope with his life situation, and with about an hour at his disposal, can possibly afford to forego such elements as delayed recall, with the extremely doubtful element of intervening disturbances, and some of the tests of mental productivity where the time element is again unwieldy. The procedure is sometimes clumsy, and some of the directions lack precision. There is an abbreviated scale, but this does not test uniformly for all the categories. The scale has monthly intervals in the first year, but falls away much too steeply to yearly ones after the second year.

The essential, however, of a test scale which is not met is statistical validity. The statistical basis of the standardization is extremely vague and unorthodox. Norms for most of the tests appear to rest on too small populations.

Dr. Bühler and her assistants have drawn most skilfully from wide sources and have constructed what will be seen to be a promising and probably fertile plan for further research and verification, once they have agreed to drop the claim to have measured "the whole personality of the child."

H. HIGHFIELD.

SCIENCE AND THE HUMAN TEMPERAMENT. By Erwin Schroedinger. Translated and with a Biographical Introduction by James Murphy. Foreword by Lord Rutherford of Nelson. London: G. Allen and Unwin, 1935. Pp. 154. 7/6.

Two principal topics form the theme of this collection of eight essays, and both are of interest to the psychological reader. One set of papers under such titles as "Science, Art and Play," "Is Science a Fashion of the Times?," and "Physical Science and the Temper of the Age," deals with the subjective nature of investigation. The other set, "The Law of Chance," "Indeterminism in Physics," "What is a Law of Nature?," "Conceptual Models in Physics and their Philosophical Value," and "The Fundamental Ideas of Wave Mechanics," has little in common by way of its subject matter. What does form a common element here is the attitude from which these essays are written, the admission of investigation's subjective nature, and the more technical

problem of the substitution of the "statistical law" for the notion of causality.

Briefly, the author is prepared to assert the "play" theory of art and science, quite dogmatically, in his first chapter. This debatable point, however, has no essential connection with the most important thesis from the psychologist's viewpoint—viz., the subjective nature of scientific investigation. Can it be said of science that it is nature viewed through a temperament? The question is largely rhetorical, for no definite answer is given, and its chief purpose is shown by the general tone of assent in which the respective second essay is written. The practical bonds that a particular civilization puts round the apparent freedom of a scientist's choice of topics of investigation are instanced as one example of the incursion of subjective interests. The final essay on this point, that on physical science and the temper of the age, is concerned with the more general ideas of a period, that must permeate every sphere of its individuals' activities. Thus the desire for change is mentioned as evidenced in the discovery of non-Euclidean geometry, and conversely of course, the theory of relativity comes in for its full share of social implications.

Prof. Schroedinger does not set out to give a positive proof of his main contentions. His work in the present volume may be mainly assessed from the psychologist's point of view in connection with the general trend of major physicists of the moment to lessen the rigidity of the distinction between "objective" and "subjective" research.

H. KAUFMAN.

THE MIND OF A DOG. By F. J. F. Buytendijk. Translated by Lillian A. Clare. London: Allen and Unwin, 1935. 8*s*. 6*d*.

Broadly speaking, we can discern two attitudes prevalent among animal psychologists. On the one hand, the attitude of those who dehumanize the man, reducing him to the level of a dog or an automaton; on the other hand, we have those who, going to the other extreme, humanize the ape. Dr. Buytendijk is one of the supreme humanizers. "The dog's eyes are speaking to us, they utter the hidden and the inexpressible—melancholy, fidelity, love and understanding." Obviously the writer loves dogs, and a lover's vision is apt to be dimmed.

But it would be very unfair to leave the impression that the book merely contains lavish outpourings of sentimentality. The bulk of the book records very clearly and simply the results of numerous experiments on the sensory and perceptual processes of dogs carried out by the author and by several other eminent physiologists and animal psychologists like H. M. Johnson, Kalischer, Szymanski, Sarris, and others. The book is apparently written for the general reader, and, since all the experiments are on sensation and perception, the author should have guarded himself against making any statements about the affective and conative life of the dog. The book has thus two parts, the one being an account of scientific experiments and the other a dash of sentimentality ending in mysticism.

The large chapter on instincts is chiefly descriptive, at the same time summarizing the work of Katz, von Uexküll, and Sarris. The conclusion of the latter was that the dog can recognize the essential characteristics of a class of objects, and with the help of its ability to view the situation, can extend this knowledge.

All the experiments were designed on Gestalt lines; that is, they were arranged in such a way as to permit the animal to utilize what intelligence and insight it possessed, unlike Thorndike's experiments in which the problem to be solved was so difficult that the dog could only achieve the

desired result by means of trial and error. The experiments were extremely original and ingenious.

The author takes the central point of the dog's psychology to be its attachment to its master. Great stress is laid on the fact that the dog is primarily olfactory, secondarily auditory, and only thirdly visual. Several very careful and interesting experiments on problem situations bring substantial support to the insight hypotheses; similarly, other experiments bring support to the view that the dog is able to recognize slight morphological differences. In the auditory sphere the author accepts the view that the dog, like the child, reacts solely to the stress, the general tone of voice used in what is uttered. Pavlov's results are criticized on the ground that the unanimous verdict pronounced by modern physiology on the central nervous system is that its functions cannot be explained by its structure. Many valuable terms are used, such as "sensory-motor judgment" and "vital phantasy" (i.e., the inner process obtruding in perception). In general, the author concludes that the mere association of impressions does not account for the behavior of animals, but that every act of animal from a certain point of view depends on insight.

J. COHEN.

AN INTRODUCTION TO SPACE PERCEPTION. By Harvey A. Carr. New York and London: Longmans, Green and Co., 1935. Pp. xi, 413. 12/6, $2.40.

The author has written this book with the laudable intention of guiding the student through the maze of literature and speculative theory which has grown up round the subject of spatial perception, and of selecting for him the most representative of the experimental results. All aspects of the problem have been covered, viz: the spatial coöperation of the senses, spatial orientation, auditory space perception, binocular vision, and the perception of distance, direction, motion, size, and shape. Very wisely the author has not adopted the detailed treatment given by Von Helmholtz and Von Kries to the problems of nativism and empiricism, and the mathematical definition of the horopter. Unfortunately the admittedly arbitrary selection of data must tend to leave the student with the impression that certain questions are far more definitely settled than is actually the case. For instance, it is stated, with much corroborative data, that "the relation between corresponding areas is mainly fixed, indissoluble and innately conditioned." Yet the work of Sander has shown that the more complex are two stereoscopic figures, the greater can be the angle of disparity at which fusion is maintained—which points to a predominantly functional relationship between corresponding areas. The author, indeed, puts forward a plea of inaccessibility in support of his omission of the work of German authorities—which omission unfortunately includes the whole of the work of the Gestalt school. We cannot help thinking that the student's imagination would have been even more successfully stimulated had the principles here enunciated been contrasted with *some* of the configurationist principles.

M. D. VERNON.

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MOTIVATION OF BEHAVIOR. By Paul Thomas Young. New York, John Wiley and Sons, 1936. xviii, 546 pp. with index. $4.00.

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PSYCHOLOGY OF ADOLESCENCE. By Luella Cole. New York, Farrar and Rinehart, 1936. xvi, 490 pp. with index. $3.00.

I KNEW THEM IN PRISON. By Mary B. Harris. New York, The Viking Press, 1936. xiii, 401 pp. with index. $3.00.

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